81

PHOTOFACT* FOLDER SET

NO. 81

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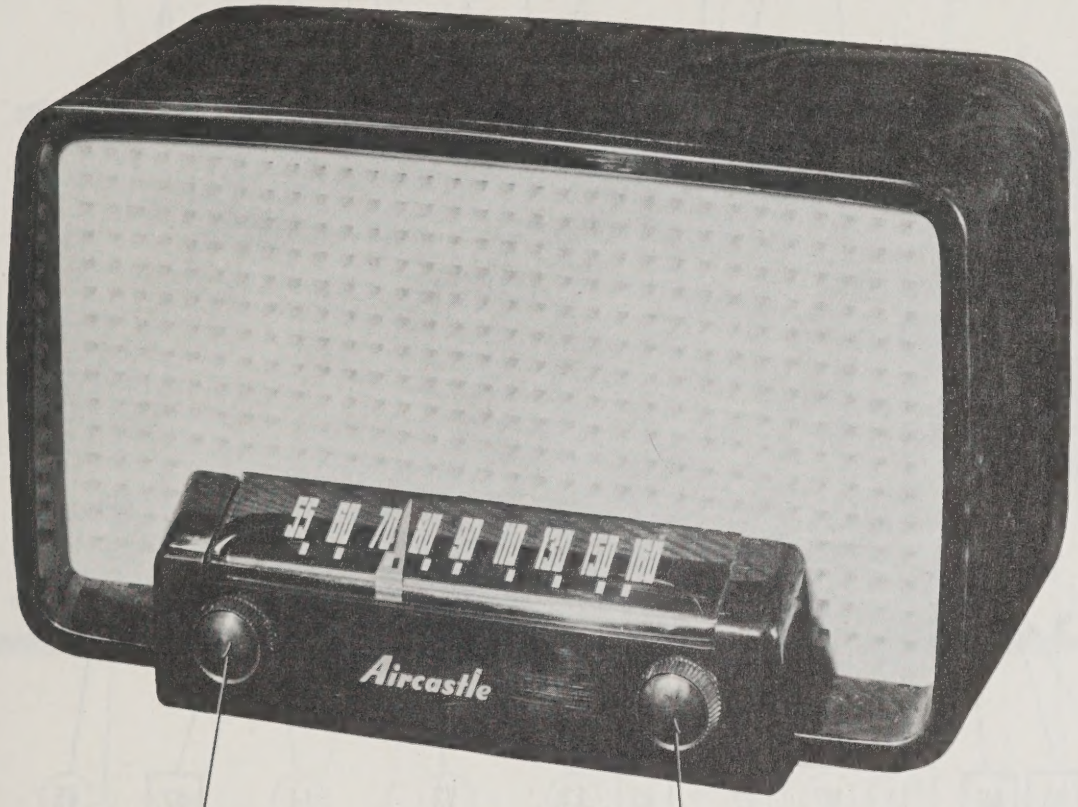
AIRCASTLE
MODEL 201



AIRCASTLE
MODEL 201

AIRCASTLE MODEL 201

TRADE NAME	Aircastle, Model 201
SUPPLIER	Spiegel, Inc. 1061 W. 35th St., Chicago, Illinois
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types 12BA6 RF Amp., 12BE6 Converter, 12BA6 IF Amp., 12AT6 DET-AVC-AF, 35C5 Power Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING: .24 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	550-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer, turn tuning gang fully closed and set the lower left edge of the pointer 1 1/8 inches to the right of the extreme left hand end of the dial backplate.

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to stator of rear section of tuning gang. Low side to B-.	455KC (400 ~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	Tune for max. output.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	DET.-AVC-AF	12AT6	12AT6	7BT	
V5	Power Output	35C5	35C5	7CV	
V6	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	25	150	CE-21	PRSA1064D	EDL5315		TA-530	Filter Green
B	50	150			BR3015		UT-301	Filter Blue
C	25	150						Filter Red
C2	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C3	.05	400	CP-503-1	P488-05	GT4S5		TM-15	AVC Filter
C4	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C5	100	500	CM-101-1	1468-0001	5W5T1	GP1K-100	1FM-31	RF Bypass
C6	.002	400	CP-202-2	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C7	.01	400	CP-103-1	P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C8	.02	400	CP-203-1	P488-02	GT4S2		TM-12	Output Plate Bypass
C9	.02	400	CP-203-1	P488-02	GT4S2		TM-12	Rect. Plate Bypass
C10	.05	400	CP-503-1	P488-05	GT4S5		72P51	Line Isolation

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	VC-8	Q13-137	M-63-Z	Volume control, See note
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

Note. Install a 100KΩ resistor in series with the right hand terminal of the new control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft end, terminals down).

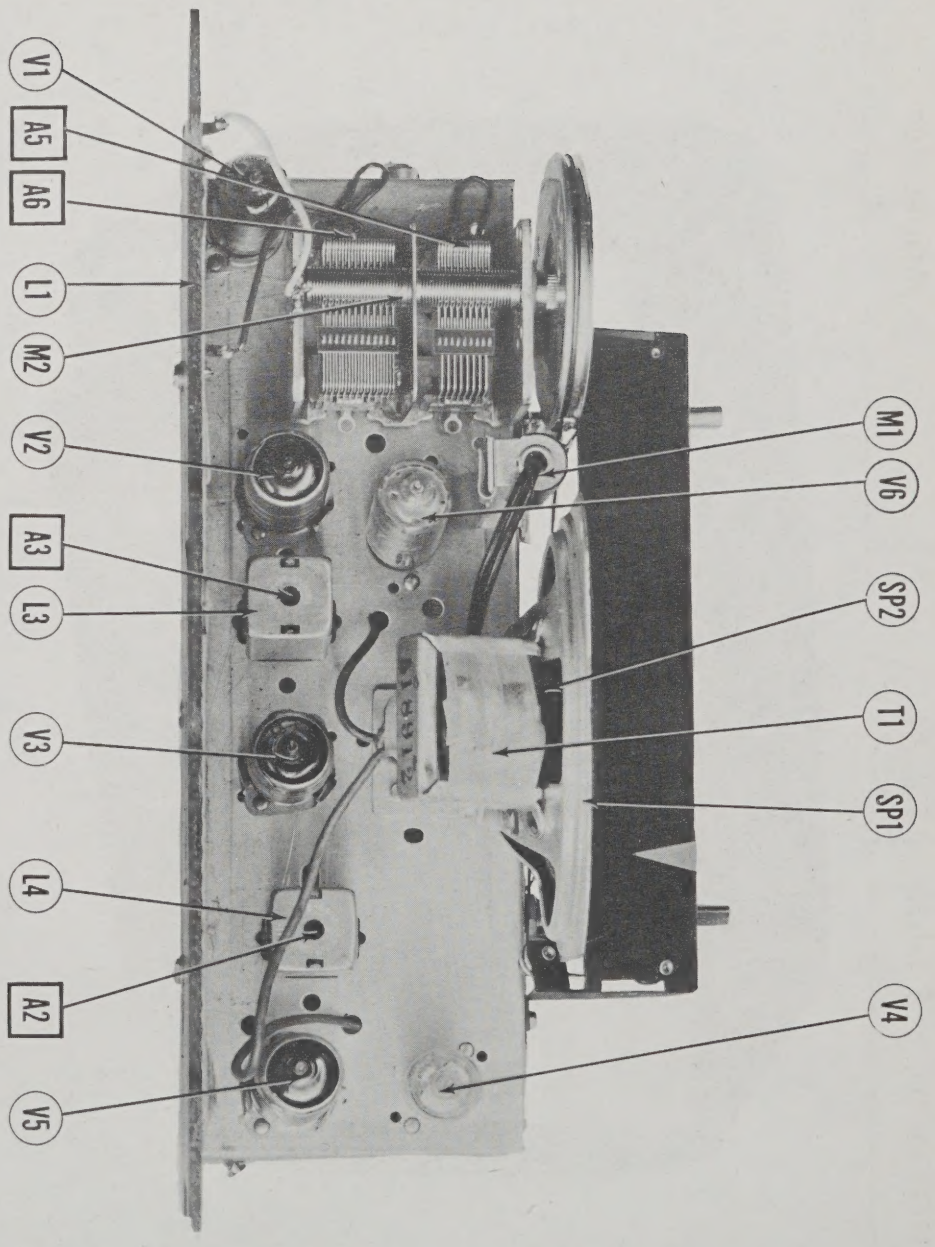
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	180Ω	½	RC-181-2	BW-½-180	RF Cathode
R3	4700Ω	½	RC-472-2	BTS-4700	RF Plate
R4	47KΩ	½	RC-473-2	BTS-47K	Conv. Grid
R5	22KΩ	½	RC-223-1	BTS-22K	Osc. Grid
R6	270Ω	½	RC-271-2	BW-½-270	IF Cathode
R7	2.2 Meg.	½	RC-225-1	BTS-2.2 Meg.	AVC Network
R8	10 Meg.	½	RC-106-1	BTS-10 Meg.	AF Grid
R9	270KΩ	½	RC-274-1	BTS-270K	AF Plate
R10	470KΩ	½	RC-474-1	BTS-470K	Output Grid
R11	180Ω	½	RC-181-2	BW-½-180	Output Cathode
R12	1200Ω	1	RC-122-5	BW-1-1200	Filter
R13	150Ω	1	RC-151-5	BW-1-150	Filter (Wire Wound)
R14	18Ω	½	RC-180-2		Rect. Ballast

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	3000Ω	3.2Ω	210Ω	.5Ω	TR-16	A-3332	A-3025	RO-2 §	§ Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-113 *†		* Remount output transformer.
SP1	PM	3.2Ω	SP-48-16	MOD. P4-X	4A07 * #	† Fabricate mounting brackets.
	CONE DIA.	V. C. DIA.				# Use universal mounting brackets provided.
SP2	3 7/8"	9/16"				

R F COILS

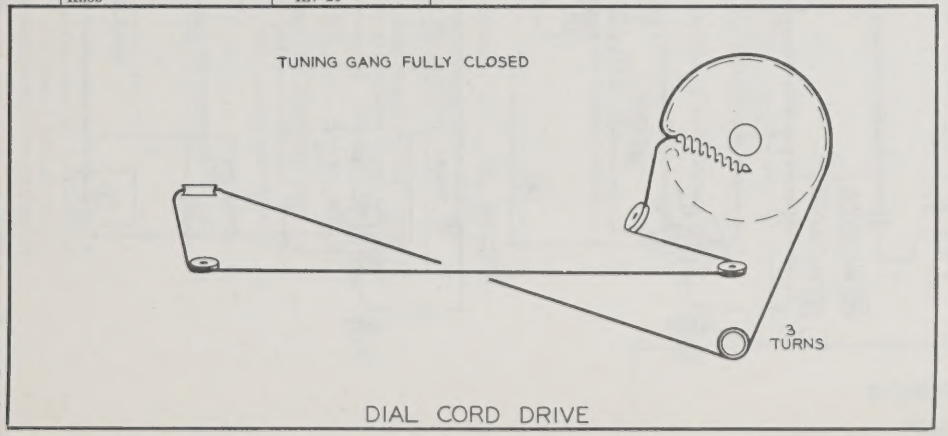
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	MEISSNER PART No.	
L1	AM Loop Ant.	3.8Ω		LP-17		
L2	Osc. Coil	.8Ω	6Ω	LC-9	14-1060 **	** Add 50MMF from high side of tuning cap to Osc. Grid.
L3	Input IF	23Ω	23Ω	LF-29	16-6678	
L4	Output IF	23Ω	23Ω	LF-29	16-6678	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRCASTLE PART No.		NOTES
M1	Bayonet	6-8	.15	Brown	BU-47		Type #47

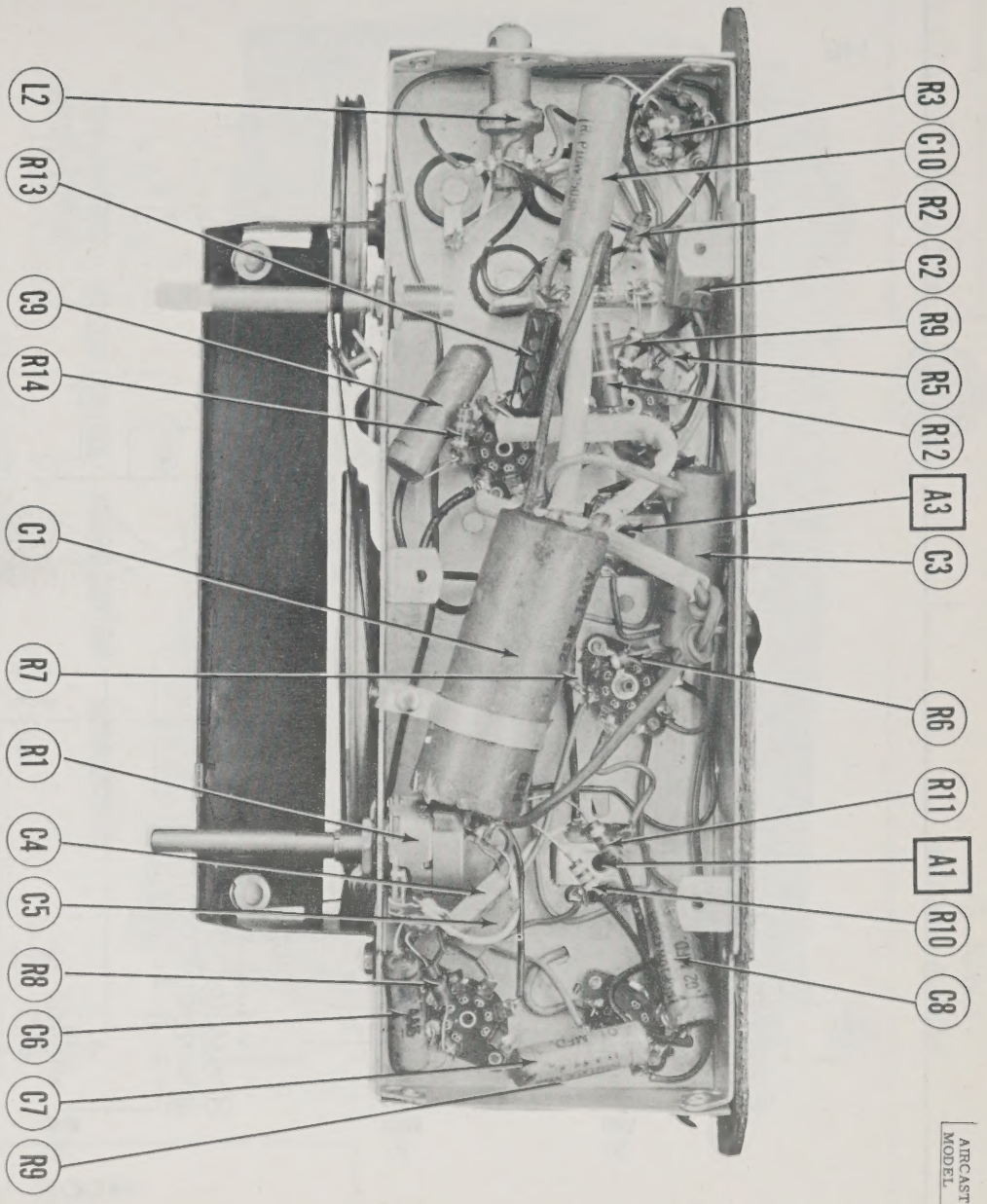
MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
M2	2 Gang. Var. Cap.	CV-15	(28-392MMF, 31-175MMF)
	Dial Pointer	PN-18	
	Cabinet	CB-105	
	Dial	DL-31	
	Knob	KN-20	



DIAL CORD DRIVE

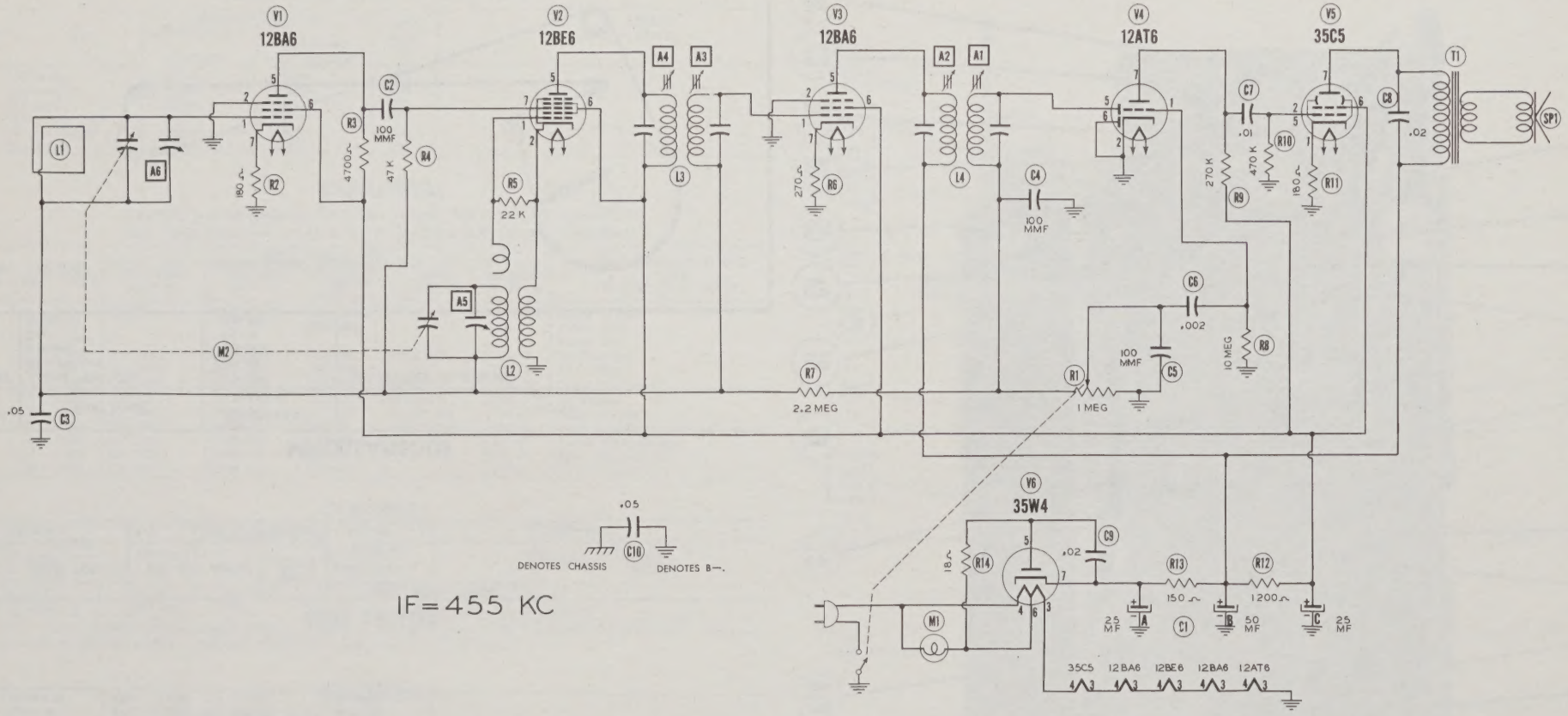
CHASSIS—BOTTOM VIEW



SET 81 FOLDER 1

AIRCASTLE MODEL 201

AIRCASTLE MODEL 201



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	-1.2VDC	0V.	13VAC	26VAC	62VDC	85VDC	1.3VDC
V 2	12BE6	§-2.1VDC	0V.	26VAC	39VAC	85VDC	85VDC	-.1VDC
V 3	12BA6	-.1VDC	0V.	39VAC	52VAC	110VDC	85VDC	1.7VDC
V 4	12AT6	-.5VDC	0V.	0VDC	13VAC	-.5VDC	0V.	41VDC
V 5	35C5	5.7VDC	0V.	52VAC	86VAC	0V.	85VDC	105VDC
V 6	35W4	0V.	0V.	86VAC	117VAC	112VAC	113VAC	117VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	3.3 Meg.	0Ω	12Ω	24Ω	†6KΩ	†1.3KΩ	180Ω
V 2	12BE6	22KΩ	1Ω	24Ω	36Ω	†1.3KΩ	†1.3KΩ	3.3 Meg.
V 3	12BA6	3.3 Meg.	0Ω	36Ω	48Ω	†150Ω	†1.3KΩ	270Ω
V 4	12AT6	10 Meg.	0Ω	0Ω	12Ω	1.1 Meg.	0Ω	†270KΩ
V 5	35C5	180Ω	470KΩ	48Ω	82Ω	470KΩ	†1.3KΩ	†360Ω
V 6	35W4	INF	INF	82Ω	110Ω	120Ω	105Ω	170KΩ

† Measured from pin 7 of V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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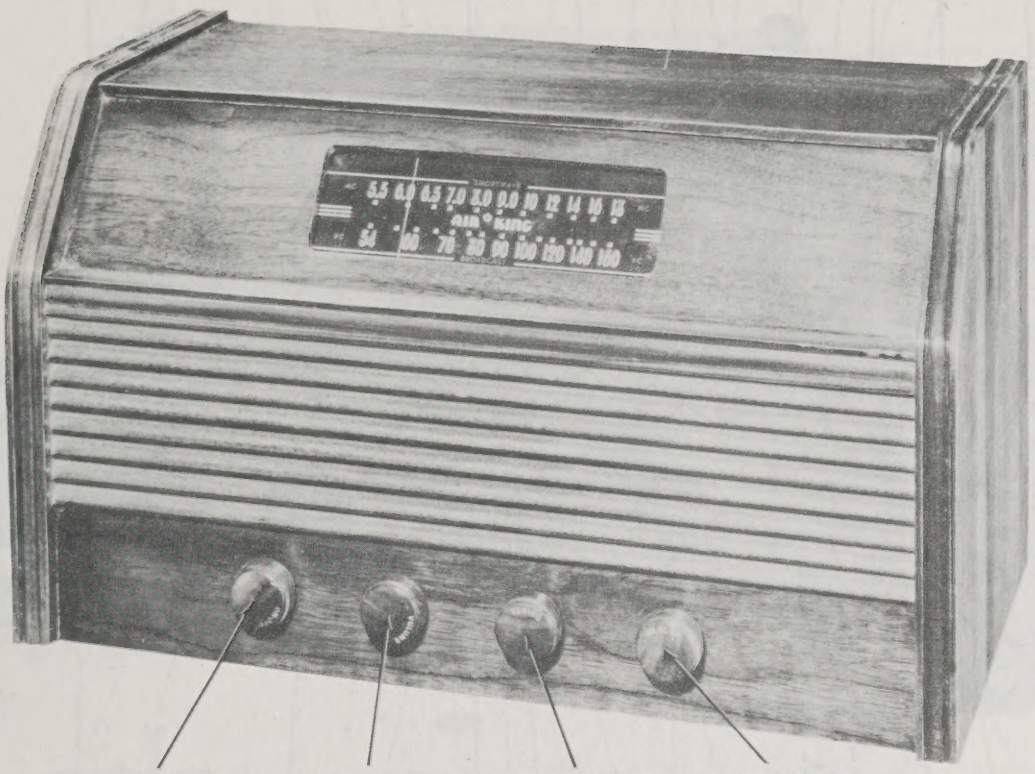
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

AIR KING
MODEL A-604



AIR KING
MODEL A-604

AIR KING MODEL A-604

TRADE NAME	Air King, Model A-604
MANUFACTURER	Air King Products Co., 170 53rd St., Brooklyn 19, New York
TYPE SET	AC Operated 2 Band Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types 6SK7GT RF Amp., 6SA7GT Converter, 6SK7GT IF Amp., 6SQ7GT DET-AVC-AF, 6V6GT Power Output, 6X5GT Rectifier
POWER SUPPLY	110-120 Volts AC — RATING .39 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — SHORT WAVE 5.4-18MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

The RMA standard dummy antenna consists of a 200MMF capacitor which is in series with a 20 microhenry coil which is shunted by a 400MMF capacitor in series with a 400Ω resistor.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 8 (Grid) of 6SA7GT (V2). Low side to chassis.	455MC (400 ~ Mod)	BC (counter-clock-wise)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	.1MFD	"	1500KC	"	1500KC	"	A5	"
3.	.1MFD	"	600KC	"	600KC	"	A6	Rock tuning gang while adjusting for maximum output.
4.		Loop	1500KC	"	1500KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.	RMA standard	High side thru dummy to antenna terminal. Low side to chassis.	18MC	SW (clock-wise)	18MC	"	A8	Adjust for maximum output. If two peaks are obtained, use the one with the trimmer further-out.
6.	"	"	16MC	"	16MC	"	A9	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR KING PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	6SK7GT	6SK7GT	8N	
V2	Converter	6SA7GT	6SA7GT	8AD	
V3	IF Amp.	6SK7GT	6SK7GT	8N	
V4	DET.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
V5	Power Output	6V6GT	6V6GT	7AC	
V6	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIR KING PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	16	350	20102	PRS450/16-16	EZ3116		UT-220	Filter Blue
B	16	350		PRS350/24	BR2045		UT-163	Filter Red
C	20	350						Filter Green
C2	25	10		PRS25/25	BR252A		TA-25	Output Cathode Bypass
C3	.05	400		P488-05	GT4S5		TM-15	AVC Filter
C4	100			1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C5	50	500		1468-00005	5W5Q5	GP1K-50	1FM-45	Osc. Grid Cap.
C6	.2	400		P488-22	GT4P2		TC-2	Decoupling
C7	.1	400		P488-1	GT4P1		TM-1	Decoupling
C8	5000	500		1467-005	1D5D5	GP2M-005	1FM-25	Fixed Padder
C9	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C10	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	Diode RF Filter
C11	.002	600		P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C12	250	500		1468-00025	5W5T25	GP2K-250	1FM-325	AF Amp. Plate Bypass
C13	.01	400		P488-01	GT4S1	GP2-335-01	TM-11	Audio Coupling
C14	.005	600		P688-005	GT6D5	GP2M-005	TM-25	Tone Compensation
C15	.01	1000		P1088-01	GT16S1		MB-11	Output Plate Bypass
C16	.05	600		P688-05	GT6S5		TM-15	Line Filter
C17	.05	600		P688-05	GT6S5		TM-15	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR KING PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1	500KΩ	1/2	2470	Q13-133	M-60-Z	Volume control
R2A	250KΩ	1/2	2521	Q11-130	M-55-S	Tone control
B	Switch		Not Req.	76-1	SW-A	Attach to R2A per instructions

RESISTORS

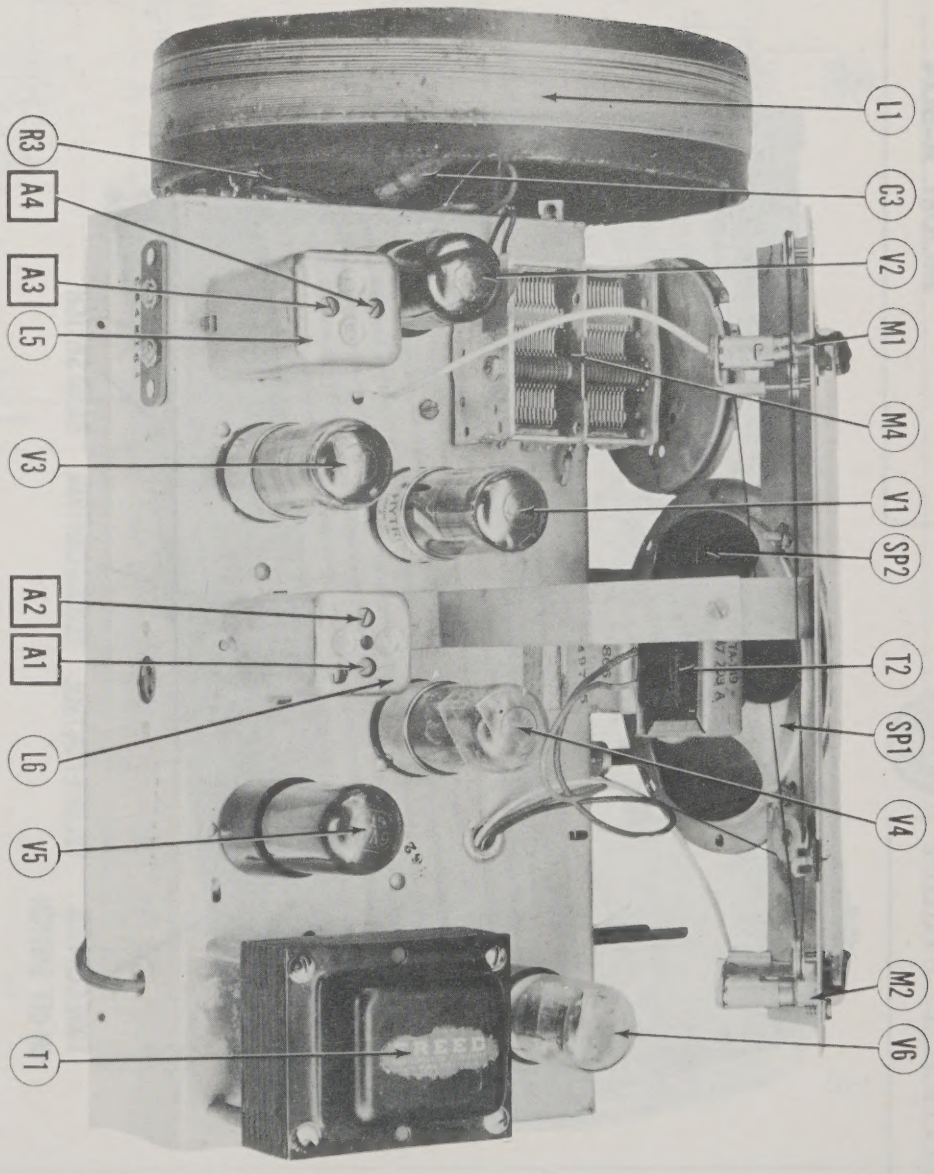
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIR KING PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R3	1000Ω	1/2		BTS-1000	Ant. Loading
R4	100KΩ	1/2		BTS-100K	AVC Network
R5	4700Ω	1/2		BTS-4700	RF Plate
R6	150Ω	1/2			Parasitic Supp.
R7	22KΩ	1/2		BTS-22K	Osc. Grid
R8	7000Ω	2		BT-2-6800	Screen Decoupling (WireWound)
R9	47KΩ	1/2		BTS-47K	Diode Filter
R10	22KΩ	1/2		BTS-22K	AVC Network
R11	470Ω	1/2		BTS-470	Decoupling
R12	10 Meg.	1/2		BTS-10 Meg.	AF Grid
R13	220KΩ	1/2		BTS-220K	AF Plate
R14	470KΩ	1/2		BTS-470K	Output Grid
R15	300Ω	1		BW-1-270	Output Cathode (Wire Wound)
R16	2200Ω	2		BW-2-2200	Filter
R17	400Ω	2		BW-2-390	Filter (Wire Wound)

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AIR KING PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC at .39A	460VCT .053ADC	6.3VAC 2.5A			P-6119 †	P-3047	PH-50 †

† Add series resistor to reduce plate voltage.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIR KING PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	4.9KΩ	3.2Ω	225Ω	.5Ω	Part of 5866	A-3877 #	A-2930 #	RO-301 #	# Bend mounting tabs down and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			AIR KING PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-105 *		
SP1	PM	3.2Ω	5866	MOD. P5-X	5A07 *	* Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	4 1/2"	9/16"				

R F COILS

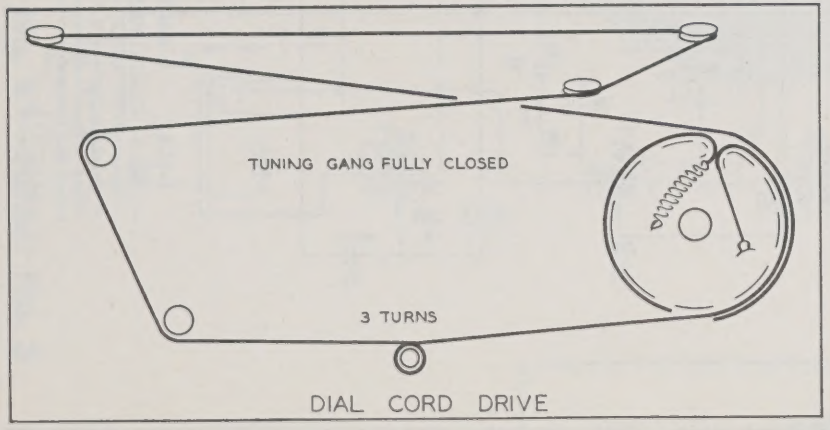
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	AIR KING PART No.	MEISSNER PART No.
L1	Loop Ant.	.2Ω	1.2Ω		
L2	SW Ant. Coil	.2Ω	0Ω	28167	14-1044
L3	SW Osc. Coil	0Ω		28168	14-1040
L4	BC Osc. Coil	5.8Ω		28169	14-1060
L5	1st IF	16Ω	15Ω	3529	
L6	2nd IF	30Ω	28Ω		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					AIR KING PART No.		
M1	Bayonet	6-8	.15	Brown	4911		Type #47
M2	Bayonet	6-8	.15	Brown	4911		Type #47

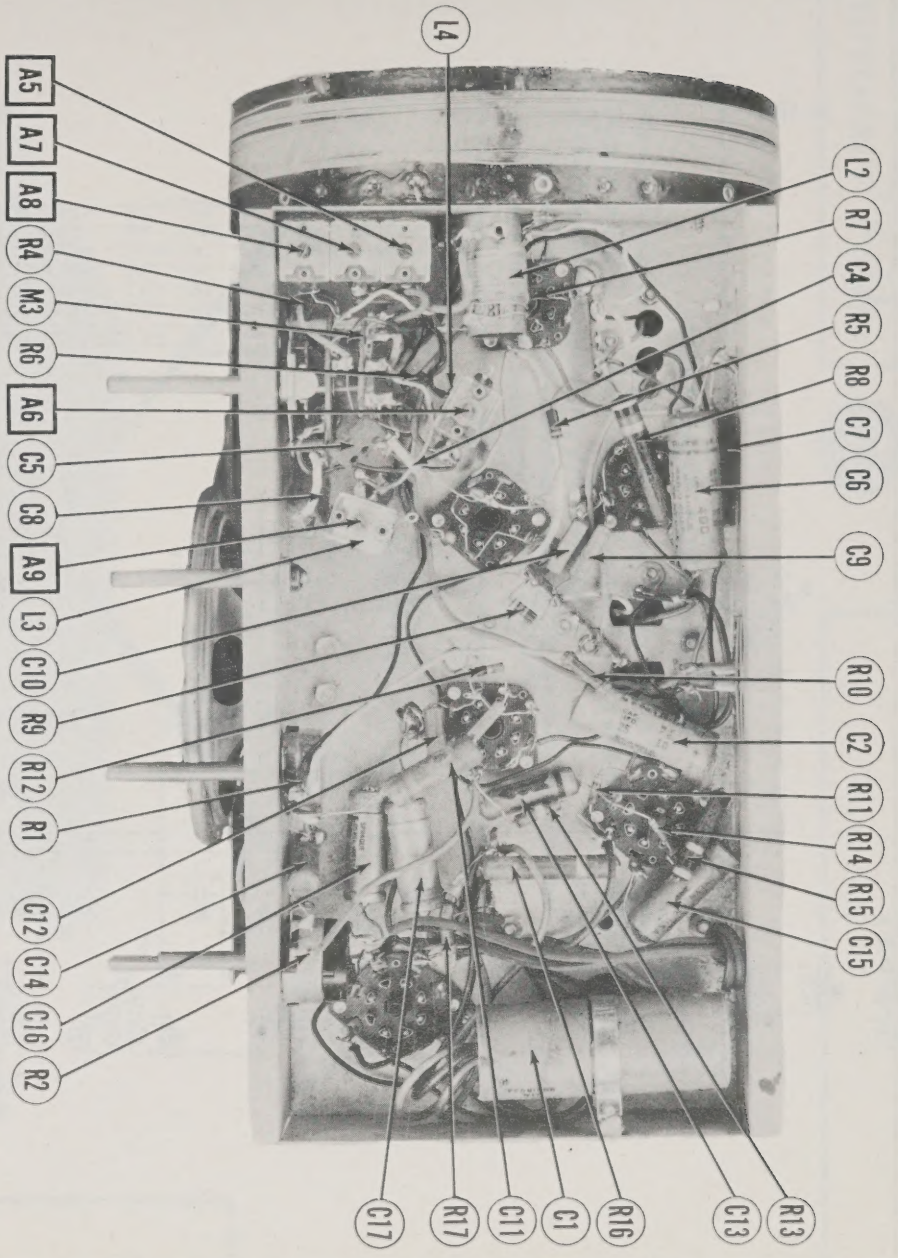
MISCELLANEOUS

ITEM No.	PART NAME	AIR KING PART No.	NOTES
M3	Switch		Band- Phono
M4	2 Gang. Var. Cap.	1668	(14-478MMF, 14-478MMF)



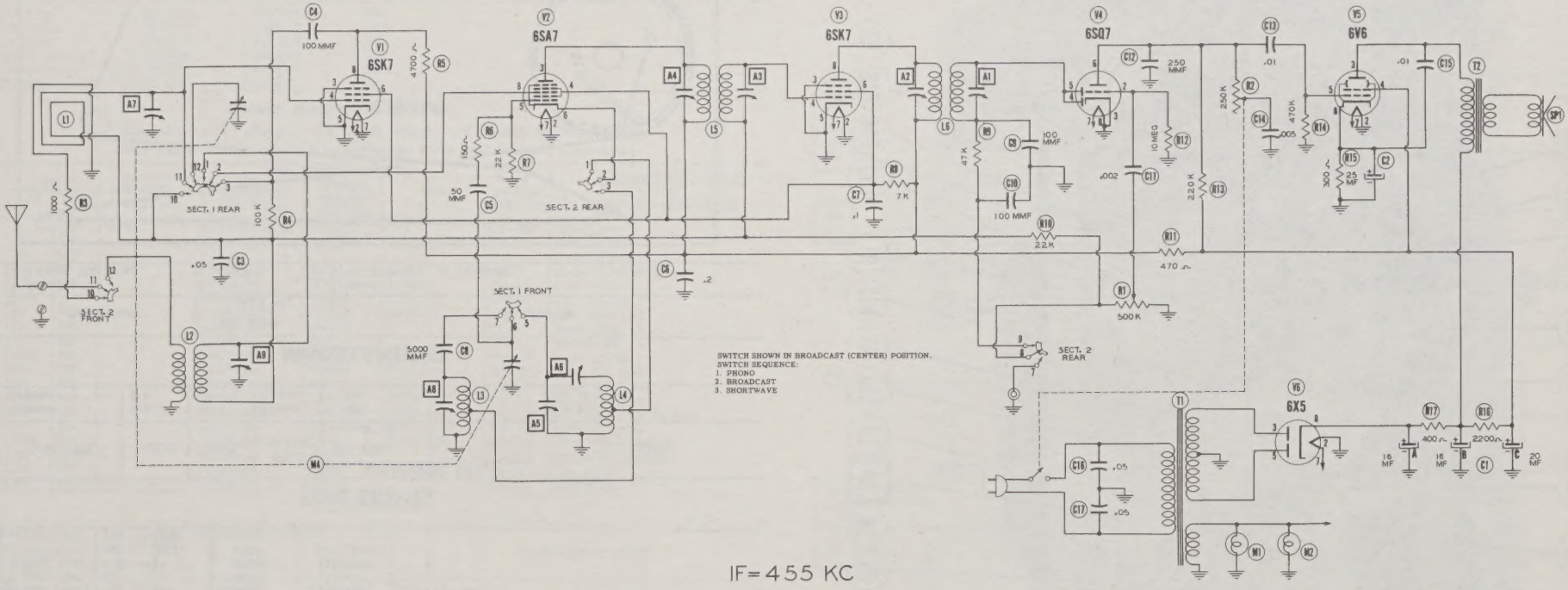
DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



SET 81 FOLDER 2

AIR KING MODEL A-604



IF = 455 KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SK7GT	0V.	6.3VAC	0V.	-.4VDC	0V.	75VDC	0V.	125VDC
V 2	6SA7GT	0V.	0V.	162VDC	75VDC	§-6.7VDC	0V.	6.3VAC	-.3VDC
V 3	6SK7GT	0V.	0V.	0V.	-.5VDC	0V.	75VDC	6.3VAC	162VDC
V 4	6SQ7GT	0V.	-.5VDC	0V.	-1.5VDC	-1.5VDC	95VDC	6.3VAC	0V.
V 5	6V6GT	0V.	0V.	235VDC	175VDC	0V.	162VDC	6.3VAC	8.8VDC
V 6	6X5GT	0V.	0V.	240VAC	0V.	240VAC	0V.	6.3VAC	270VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SK7GT	0Ω	.1Ω	0Ω	520KΩ	0Ω	†10KΩ	0Ω	†7.8KΩ
V 2	6SA7GT	0Ω	0Ω	†3KΩ	†10KΩ	22KΩ	.5Ω	.1Ω	620KΩ
V 3	6SK7GT	0Ω	0Ω	0Ω	520KΩ	0Ω	†10KΩ	.1Ω	†3KΩ
V 4	6SQ7GT	0Ω	10 Meg.	0Ω	500KΩ	500KΩ	†220KΩ	.1Ω	0Ω
V 5	6V6GT	0Ω	0Ω	1600Ω	†2.6KΩ	470KΩ	†3KΩ	.1Ω	300Ω
V 6	6X5GT	0Ω	0Ω	130Ω	INF	135Ω	INF	.1Ω	130KΩ

† Measured from pin 8 of V6.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume controls at minimum, proper output load connected.

PHOTOFACT* Folder

AUTOMATIC MODEL
TV-P490

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AUTOMATIC MODEL
TV-P490

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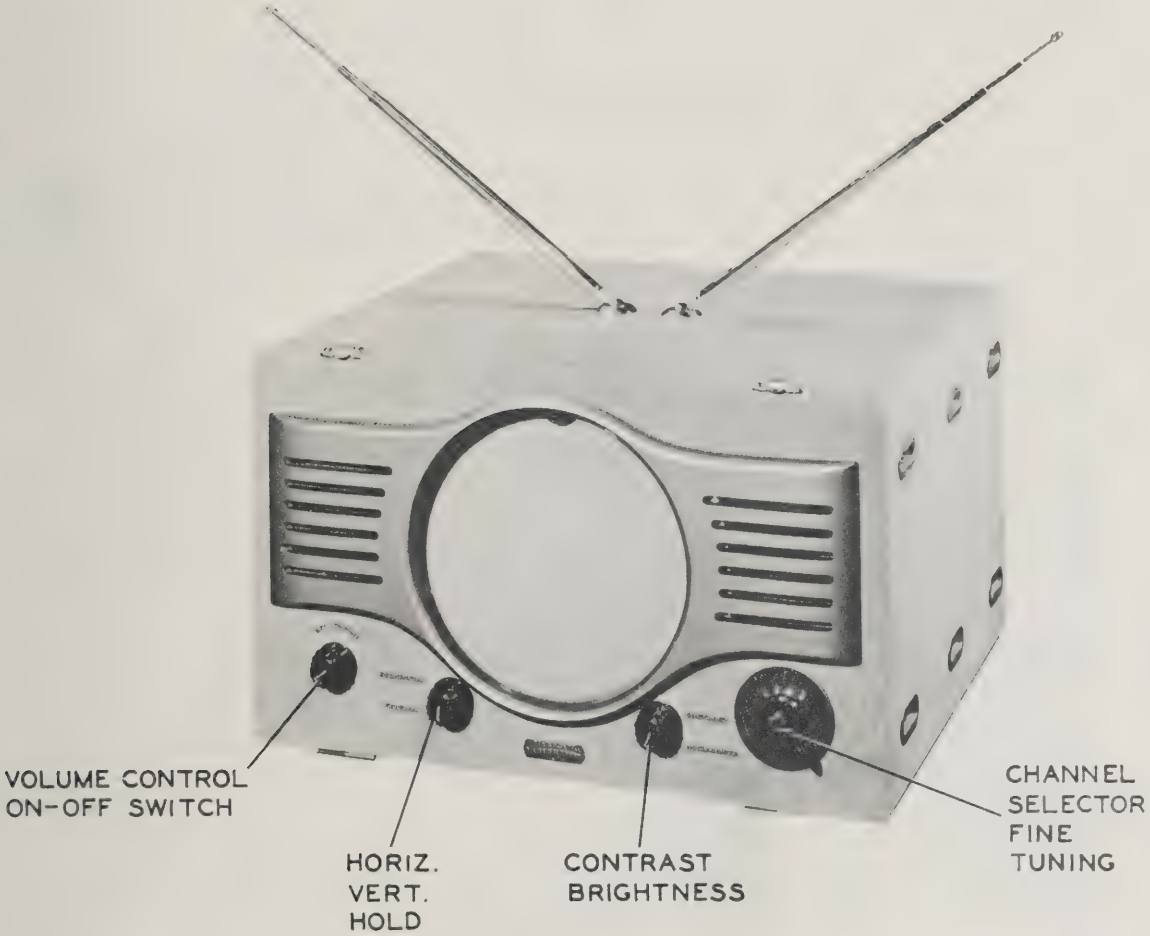

AUTOMATIC
MODEL TV-P490

TRADE NAME	Automatic, Model TV-P490
MANUFACTURER	Automatic Radio Mfg., Co., Inc., 122 Brookline Ave., Boston 15, Mass.
TYPE SET	Television Receiver
TUBES	Twenty Two
POWER SUPPLY	110-120 Volts AC
RATING:	1.03 Amp. at 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

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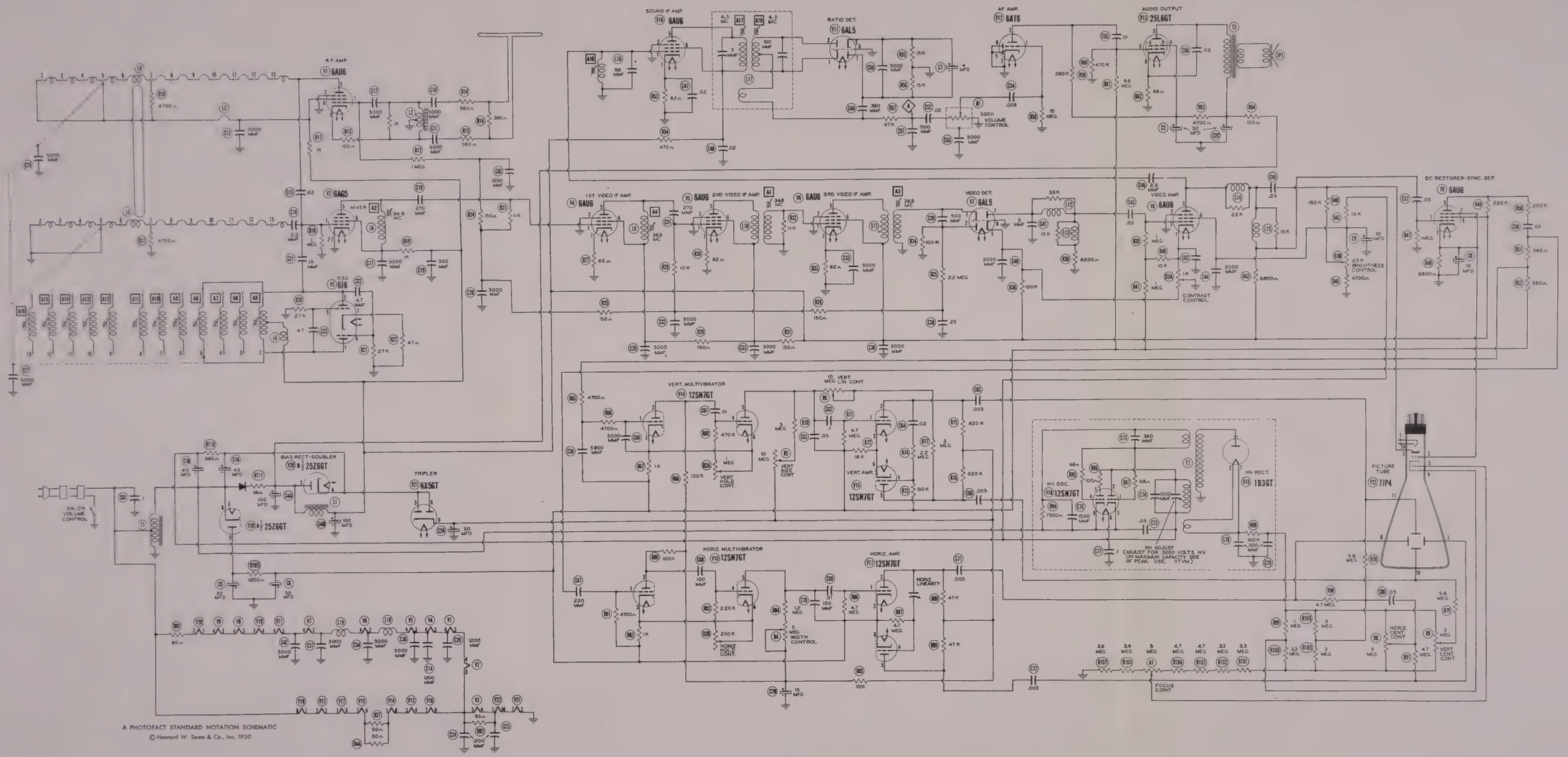

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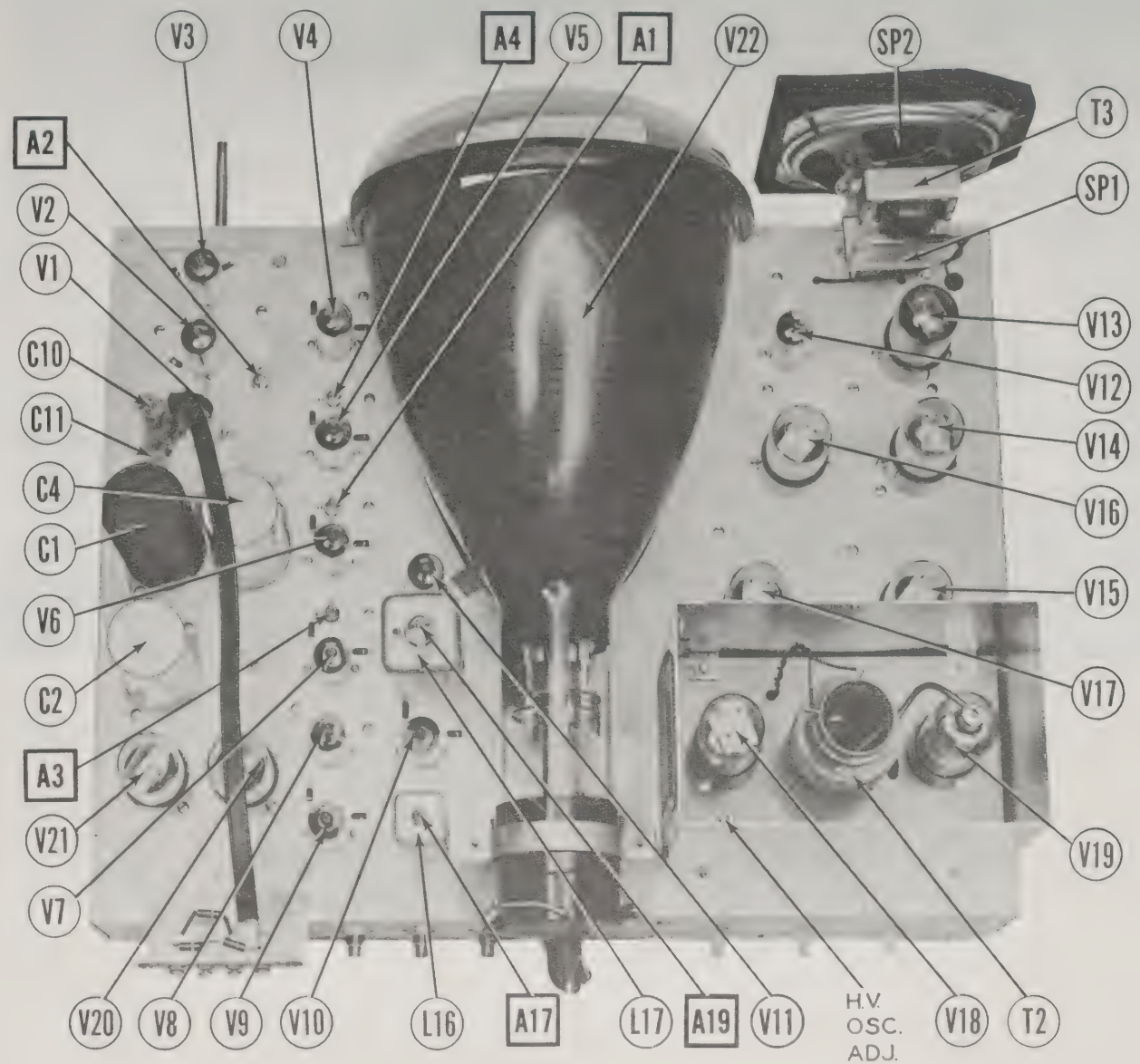
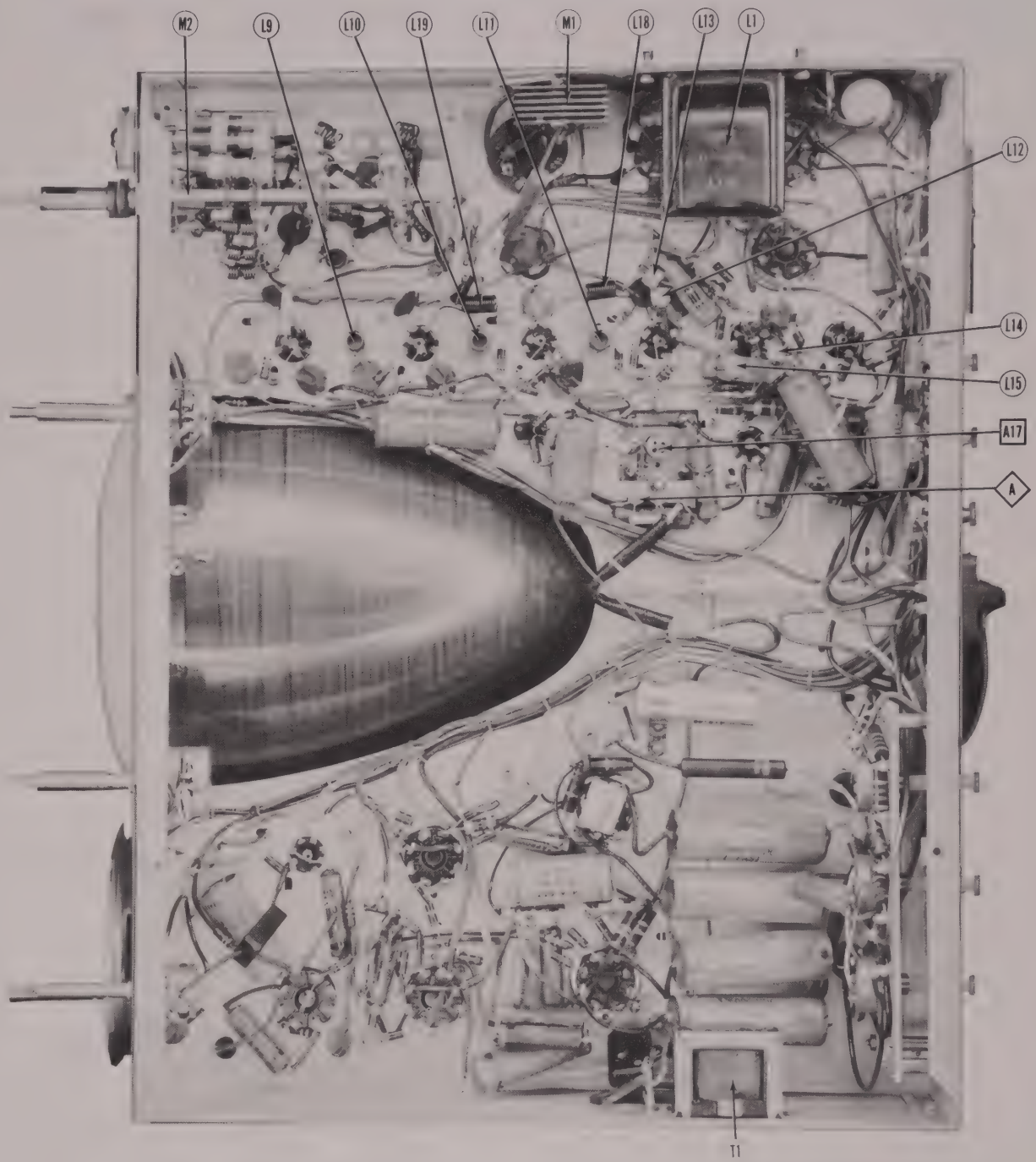
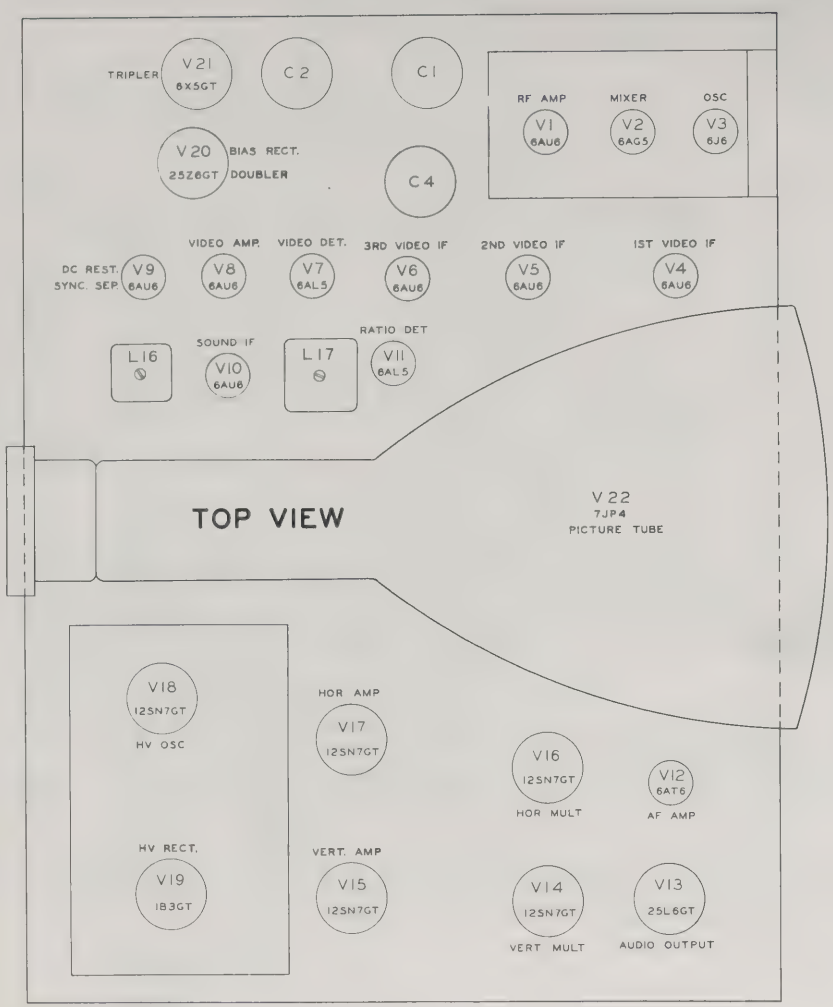
AUTOMATIC
MODEL TV-P490

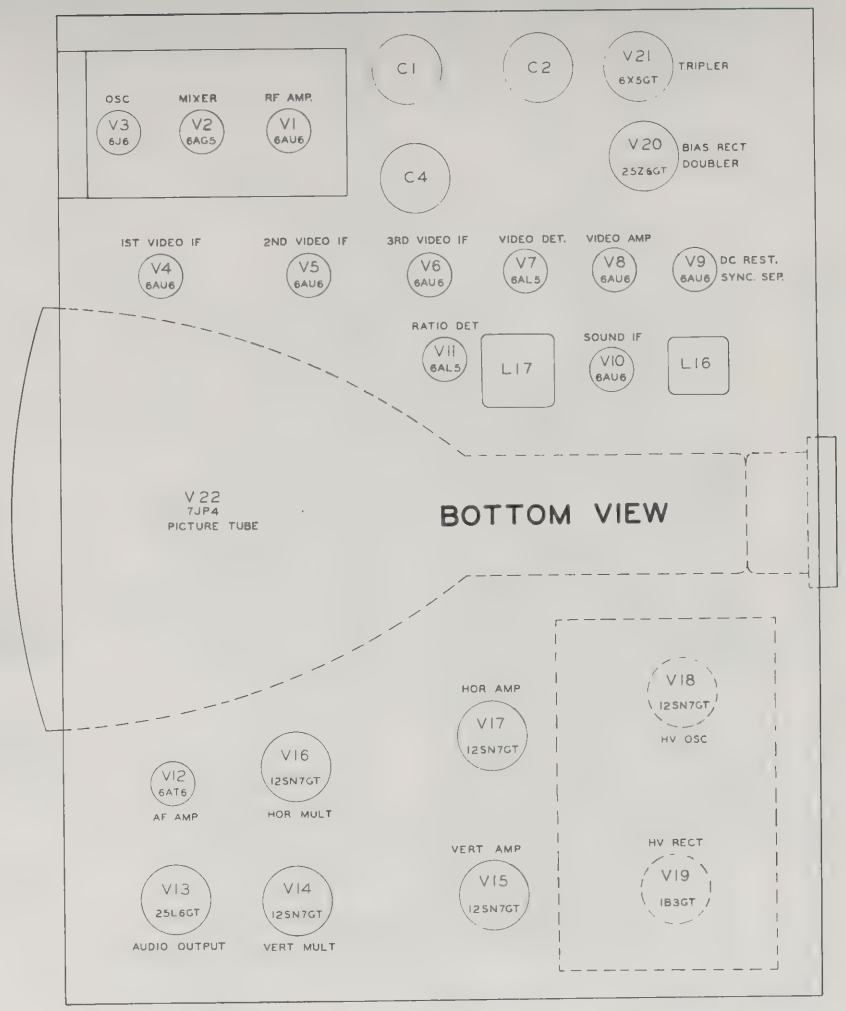


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

AUTOMATIC
MODEL TV-P490

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate shock hazard, disable high voltage by unsoldering the lead feeding B+ to high voltage oscillator tube 12SN7 (V18). Use an isolation transformer when available as one side of the line is connected to chassis.

VIDEO IF ALIGNMENT

A tube shield slipped over the mixer tube, but not grounded, makes a practical and convenient method of injecting the signal from the signal generator. The signal generator output is adjusted to give a reading of approximately -1 volt at Pin 7 6AL5 (V7) with AGC line grounded.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1		High side to ungrounded tube shield (See prealignment instructions). Low side to chassis.	34.8MC (No mod.)	Any	DC probe to Pin 7 6AL5 (V7). Common lead to chassis.	A1,A2	Adjust for maximum deflection. Reduce signal gen. output if necessary to hold about -1 volt reading
2		"	36.9MC (No mod.)	"	"	A3,A4	"

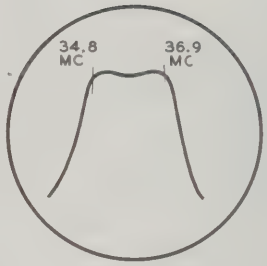


FIG. 1

OVERALL IF RESPONSE CHECK

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3		High side to ungrounded tube shield (See above). Low side to chassis.	35MC (10MC sweep)	34.8MC & 36.9MC	Any	Vertical amp. to Pin 1 6AU6 (V8). Low side to chassis.		Check response pattern to see that markers appear as per Fig. 1. If not, make slight adjustments of A1, A2, A3 and A4.

RF OSCILLATOR ALIGNMENT

The RF Amplifier and mixer lines are pre-set at the factory and due to their stability normally do not require adjustment. Since Channel 2 Oscillator Coil is in parallel with all other osc. coils at their respective channels. Channel 2 must be aligned first. If Channel 2 is readjusted at any time, it will be necessary to realign all the other channels.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4	2 - 150Ω carbon res. in series with each antenna lead.	Across "Distant" antenna terminal strip.	57MC (10MC sweep)	55.25MC (Picture) 59.75MC (Sound)	2	Vert. Amp. to Pin 1 6AU6 (V8). Low side to chassis.	A5	Adjust to place picture marker at 50% point on pattern as per Fig. 2. Check sound carrier to see if it appears at proper point as per Fig. 2.
5	"	"	63MC (10MC sweep)	61.25MC (Picture) 65.75MC (Sound)	3	"	A6	"
6	"	"	69MC (10MC sweep)	67.25MC (Picture) 71.75MC (Sound)	4	"	A7	"
7	"	"	79MC (10MC sweep)	77.25MC (Picture) 81.75MC (Sound)	5	"	A8	"
8	"	"	85MC (10MC sweep)	83.25MC (Picture) 87.75MC (Sound)	6	"	A9	"
9	"	"	177MC (10MC sweep)	175.25MC (Picture) 179.75MC (Sound)	7	"	A10	"
10	"	"	183MC (10MC sweep)	181.25MC (Picture) 185.75MC (Sound)	8	"	A11	"
11	"	"	189MC (10MC sweep)	187.25MC (Picture) 191.75MC (Sound)	9	"	A12	"
12	"	"	195MC (10MC sweep)	193.25MC (Picture) 197.75MC (Sound)	10	"	A13	"
13	"	"	201MC (10MC sweep)	199.25MC (Picture) 203.75MC (Sound)	11	"	A14	"
14	"	"	207MC (10MC sweep)	205.25MC (Picture) 209.75MC (Sound)	12	"	A15	"
15	"	"	213MC (10MC sweep)	211.25MC (Picture) 215.75MC (Sound)	13	"	A16	"

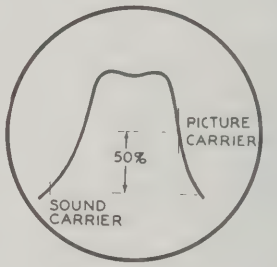
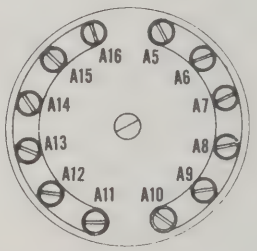


FIG. 2

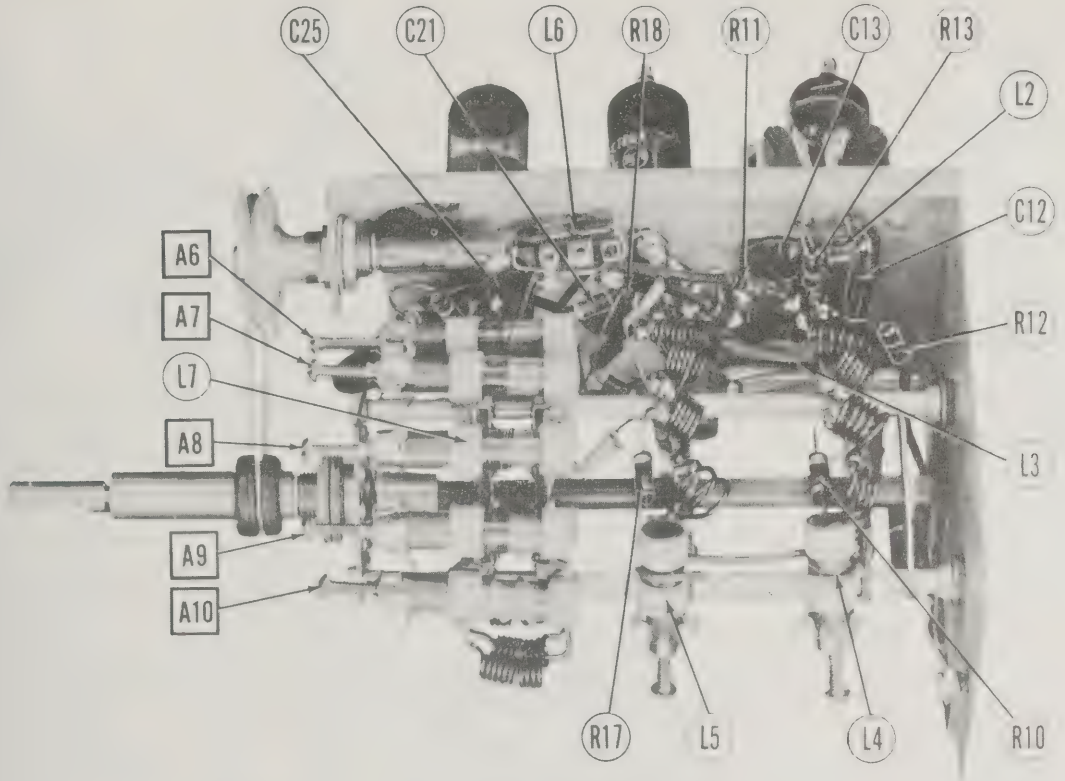


OSC. ALIGNMENT POINTS

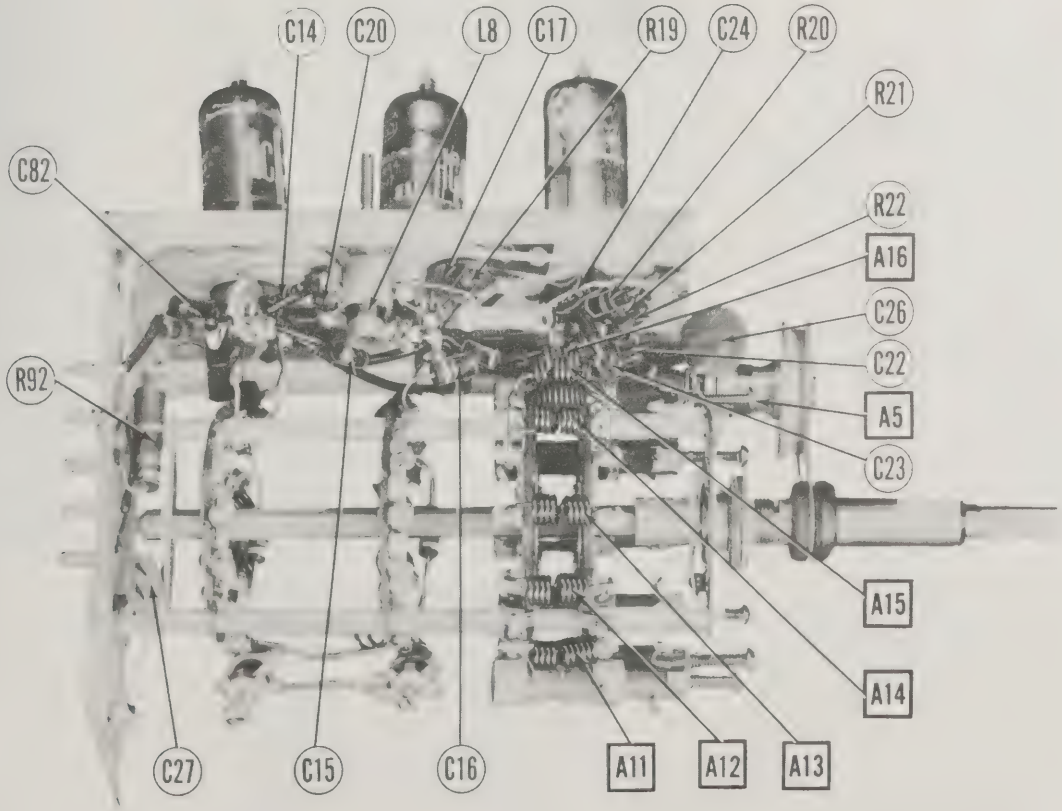
SOUND IF ALIGNMENT

When adjusting the 4.5MC trap and the primary of the ratio detector coils (A17 & A18), attenuate signal generator so VTVM reading is held to approximately -3 to -4 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
16	5000MMF	High side to Pin 1 6AU6 (V8). Low side to chassis.	4.5MC (No mod.)	Any	DC probe to Pin 7 6AL5 (V10). Common lead to chassis.	A17, A18	Adjust for maximum deflection.
17	5000MMF	"	"	"	DC probe to Point (A). Common lead to chassis	A19	Adjust for zero reading. A positive & negative reading can be obtained on either side of the correct setting.



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0V.	0V.	24VAC	30VAC	125VDC	125VDC	.3VDC		
V 2	6AG5	-1.7VDC	0V.	18VAC	24VAC	125VDC	125VDC	0V.		
V 3	6J6	120VDC	120VDC	18VAC	12VAC	§-5VDC	§-3.5VDC	.8VDC		
V 4	6AU6	-1.2VDC	0V.	31VAC	36VAC	125VDC	125VDC	0V.		
V 5	6AU6	-.8VDC	0V.	36VAC	42VAC	125VDC	125VDC	0V.		
V 6	6AU6	0V.	0V.	42VAC	48VAC	127VDC	127VDC	.8VDC		
V 7	6AL5	0V.	-2.6VDC	48VAC	53VAC	0V.	0V.	-1.9VDC		
V 8	6AU6	.4VDC	0V.	64VAC	70VAC	90VDC	175VDC	10VDC		
V 9	6AU6	0V.	3.5VDC	70VAC	75VAC	47VDC	125VDC	3.5VDC		
V 10	6AU6	0V.	0V.	64VAC	58VAC	122VDC	122VDC	.8VDC		
V 11	6AL5	-.1VDC	-.1VDC	53VAC	58VAC	.1VDC	0V.	-.1VDC		
V 12	6AT6	-.5VDC	0V.	32VAC	31VAC	0V.	0V.	37VDC		
V 13	25L6GT	0V.	103VAC	125VDC	115VDC	-2.4VDC	0V.	78VAC	2.5VDC	
V 14	12SN7GT	‡ 0V.	‡100VDC	‡ 3VDC	‡-2.8VDC	‡ 13VDC ‡ 37VDC	‡3VDC	50VAC	38VAC	
V 15	12SN7GT	‡ 0V.	‡225VDC	‡ 12VDC	‡ 0V.	‡ 225VDC	‡ 12VDC	64VAC	50VAC	
V 16	12SN7GT	‡ 0V.	‡ 67VDC	‡2.2VDC	‡-4.9VDC	‡ 12VDC ‡ 50VDC	‡ 2.2VDC	31VAC	19VAC	
V 17	12SN7GT	‡ -22VDC	‡300VDC	‡ 0V.	‡-1.9VDC	‡300VDC	‡ 0V.	78VAC	64VAC	
V 18	12SN7GT	♦ -35VDC	♦260VDC	♦ 0V.	♦-35VDC	♦250VDC	♦0V.	103VAC	117VAC	
V 19	1B3GT	* DO NOT MEASURE								
V 20	25Z6GT	0V.	100VAC	135VDC	270VDC	-130VDC	0V.	75VAC	134VAC	
V 21	6X5GT	0V.	0V.	270VDC	0V.	270VDC	0V.	6.3VAC	410VDC	

V 22	PINS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	7JP4	1.2VAC	135VDC	3.4VDC	0V	*	0V	*	*	*	*	*	0V	0V	6.3VAC

‡ Measured from pin 3 of V17
♦ Measured from pin 8 of V20
* Do not measure.

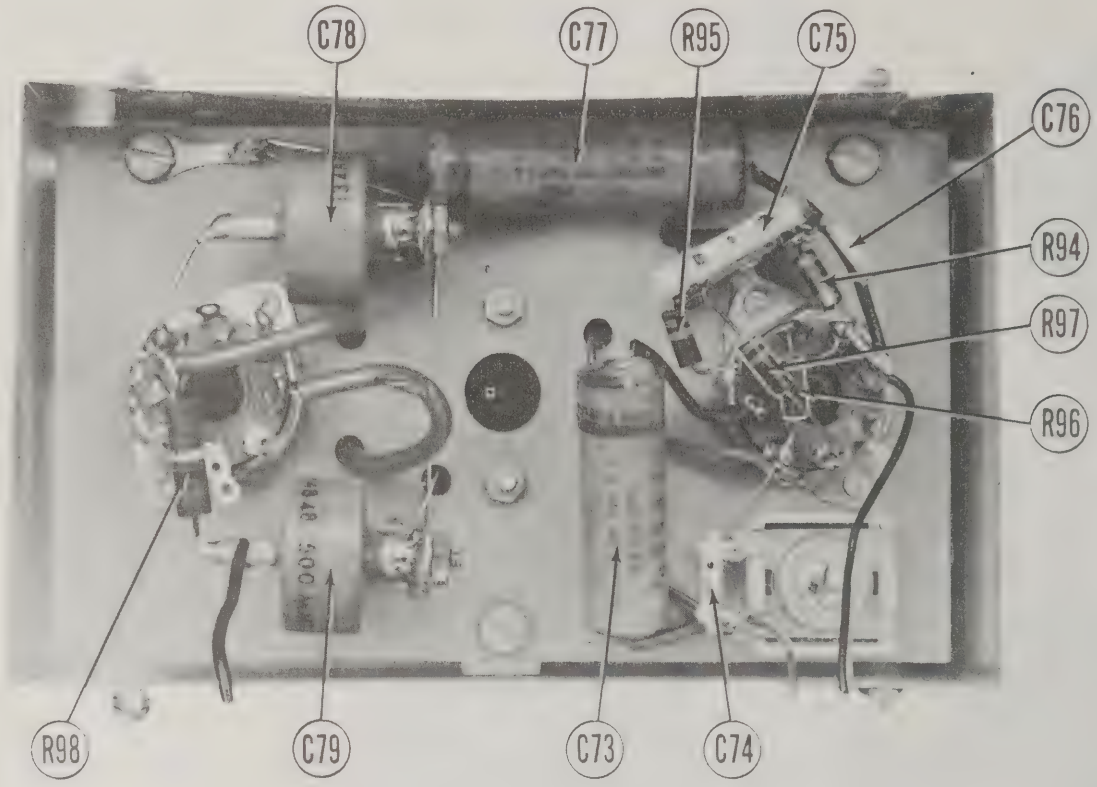
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	3.3 Meg.	0Ω	7.5Ω	12Ω	†1000Ω	†1000Ω	130Ω		
V 2	6AG5	1 Meg.	0Ω	5Ω	7.5Ω	†1000Ω	†1000Ω	0Ω		
V 3	6J6	†150Ω	†150Ω	5Ω	3Ω	27KΩ	27KΩ	47Ω		
V 4	6AU6	2.3 Meg.	0Ω	19Ω	22Ω	†450Ω	†450Ω	0Ω		
V 5	6AU6	2.3 Meg.	0Ω	22Ω	25Ω	†300Ω	†300Ω	0Ω		
V 6	6AU6	.1Ω	0Ω	25Ω	28Ω	†150Ω	†150Ω	82Ω		
V 7	6AL5	.1Ω	100KΩ	28Ω	31Ω	4Ω	0Ω	8.2KΩ		
V 8	6AU6	1 Meg.	0Ω	35Ω	38Ω	†7KΩ	#10KΩ	1000Ω		
V 9	6AU6	1 Meg.	6.3kΩ	38Ω	40Ω	†200kΩ	†150Ω	6.8KΩ		
V 10	6AU6	1.5Ω	0Ω	35Ω	33Ω	†550Ω	†550Ω	82Ω		
V 11	6AL5	INF	INF	30Ω	33Ω	15KΩ	0Ω	15KΩ		
V 12	6AT6	10 Meg.	0Ω	23Ω	20Ω	0Ω	0Ω	†400KΩ		
V 13	25L6GT	0Ω	42Ω	†320Ω	†4KΩ	470KΩ	INF	43Ω	68Ω	
V 14	12SN7GT	▲ 11KΩ	♦ 110KΩ	▲ 2KΩ	▲ 470KΩ	♦ 7 Meg. ♦2.5Meg.	▲ 2KΩ	29Ω	23Ω	
V 15	12SN7GT	▲4.7Meg.	♦ 820KΩ	▲ 18KΩ	▲ 150KΩ	♦820KΩ	▲ 18KΩ	42Ω	40Ω	
V 16	12SN7GT	▲ 5KΩ	♦110KΩ	▲ 2KΩ	▲ 230KΩ	♦6.2 Meg. ♦1.3 Meg.	‡1000Ω	19Ω	12Ω	
V 17	12SN7GT	▲4.7Meg.	♦47KΩ	▲ 1000Ω	▲ 4.7Meg.	♦ 47KΩ	▲ 1000Ω	43Ω	41Ω	
V 18	12SN7GT	♦ 7.5KΩ	# 700Ω	♦ 0Ω	♦7.5KΩ	# 300Ω	♦ 0Ω	43Ω	40Ω	
V 19	1B3GT	INF	INF	INF	INF	INF	INF	INF	INF	TOP CAP 680Ω
V 20	25Z6GT	INF	40Ω	22KΩ	40kΩ	500KΩ	INF	34Ω	43Ω	
V 21	6X5GT	INF	0Ω	40kΩ	INF	40KΩ	INF	1.8Ω	190KΩ	

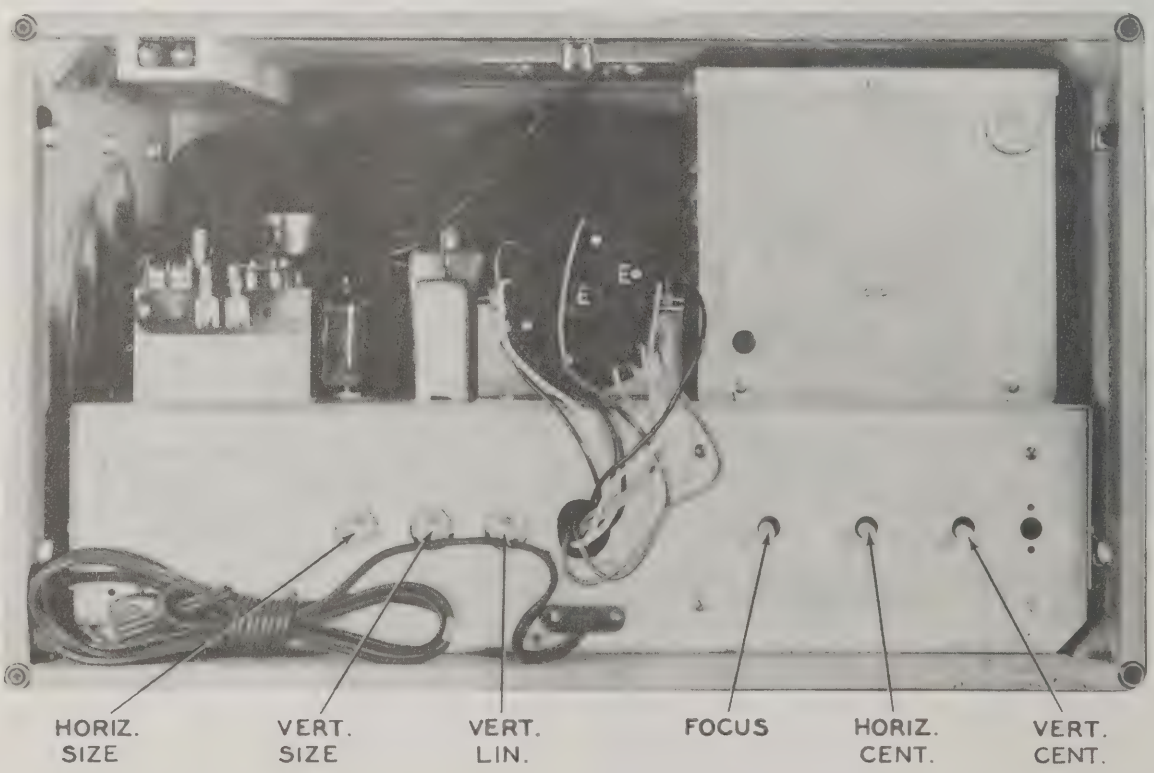
V 22	PINS	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	7JP4	1.8Ω	115KΩ	6.8KΩ	INF.	13Meg. 8Meg.	INF.	33Meg.	33Meg.	28Meg.	33Meg.	33Meg.	INF.	INF.	3Ω

† Measured from pin 3 of V20.
# Measured from pin 4 of V20.
♦ Measured from pin 8 of V21.
▲ Measured from pin 5 of V20.
♦ Measured from pin 8 of V20.
‡ Measured from pin 3 of V17.

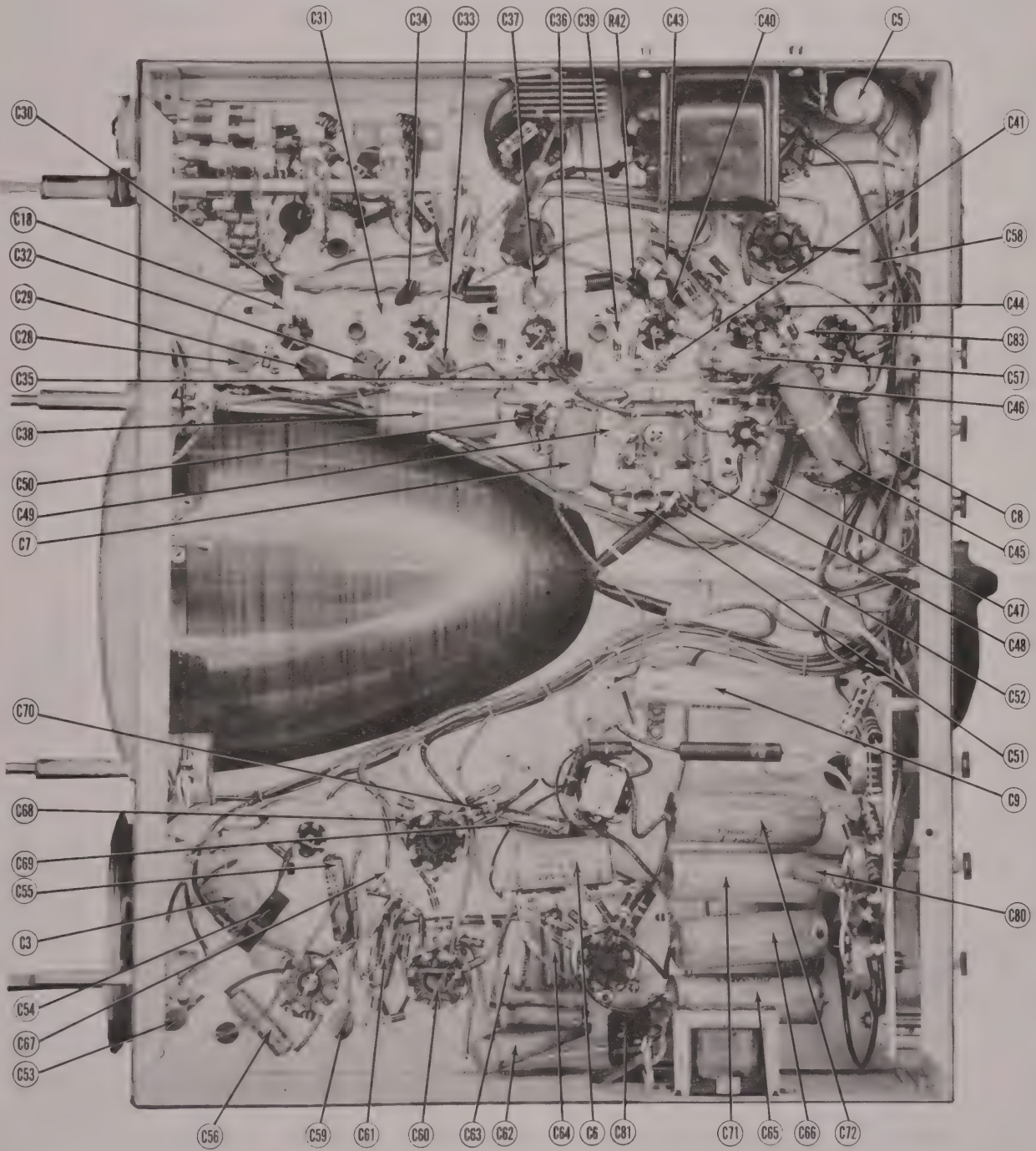
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



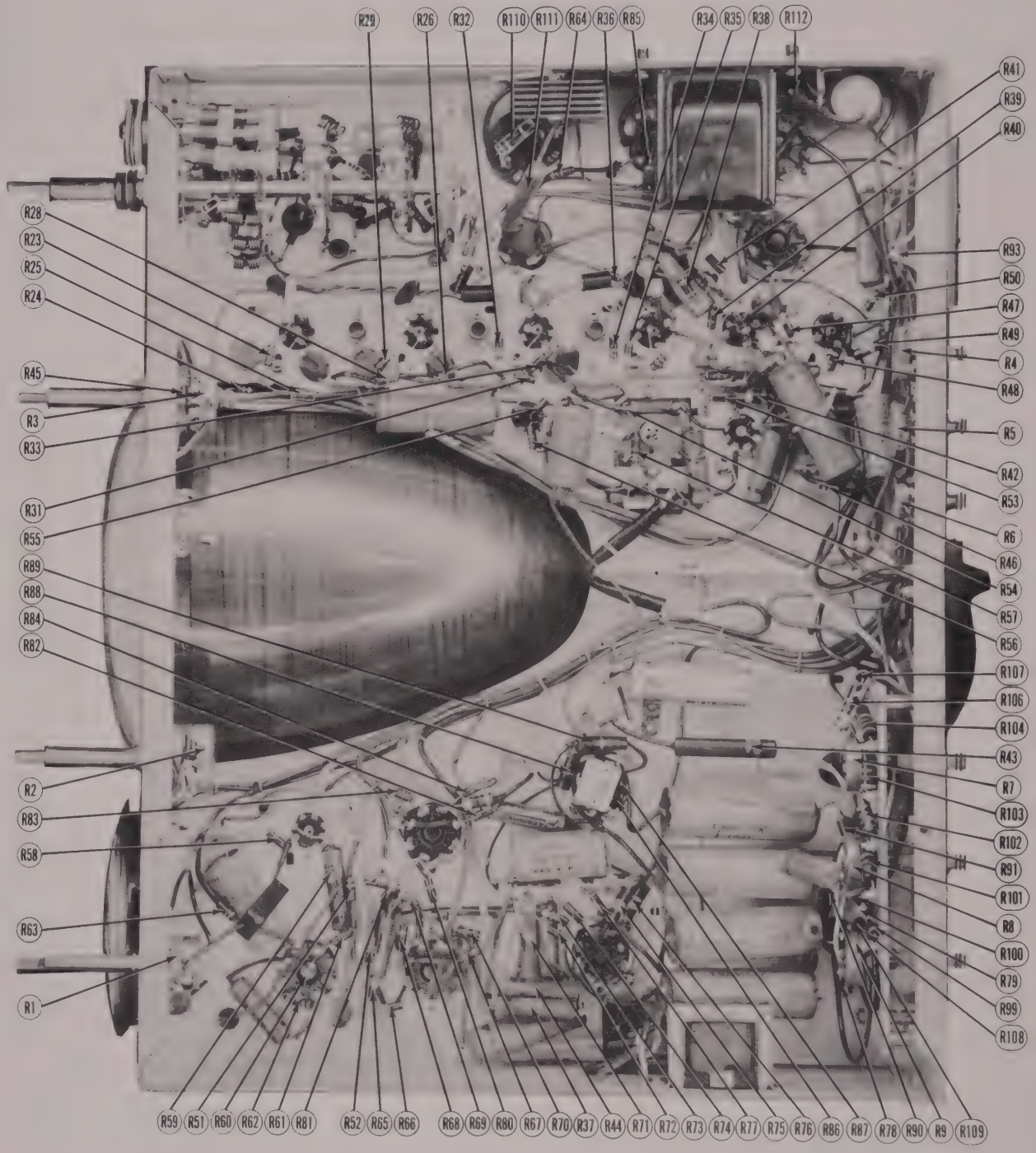
HIGH VOLTAGE SUPPLY - BOTTOM VIEW



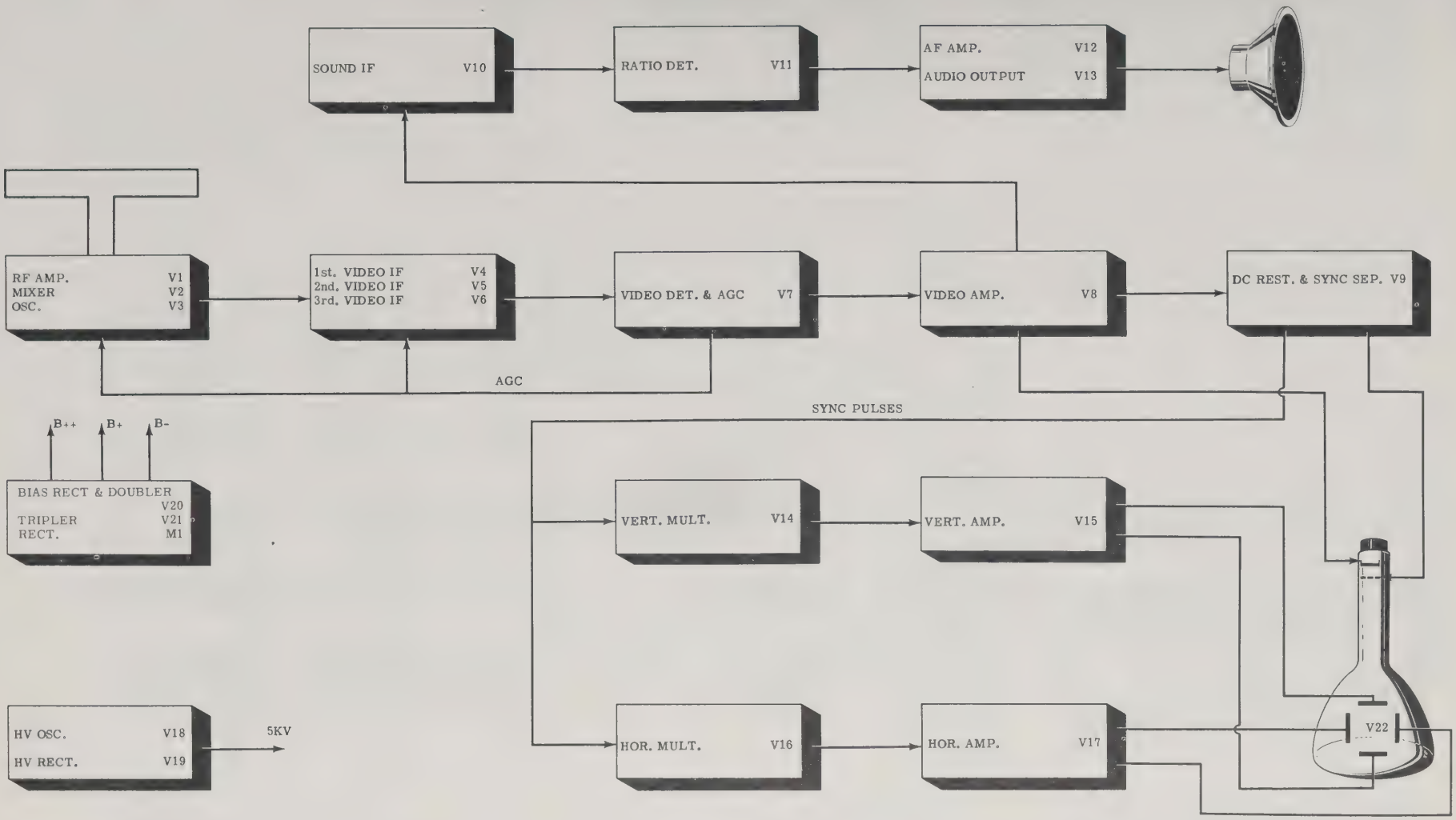
CABINET - REAR VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



BLOCK DIAGRAM

AUTOMATIC
MODEL TV-P490

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No	USE	REPLACEMENT DATA: AUTOMATIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp		6AU6	7BK	
V2	Mixer		6AG5	7BD	
V3	Osc.		6J6	7BF	
V4	1st Video IF Amp.		6AU6	7BK	
V5	2nd Video IF Amp.		6AU6	7BK	
V6	3rd Video IF Amp.		6AU6	7BK	
V7	Video Det.		6AL5	6BT	
V8	Video Amp.		6AU6	7BK	
V9	DC Restorer -Sync. Sep		6AU6	7BK	
V10	Sound IF Amp.		6AU6	7BK	
V11	Ratio Det		6AL5	6BT	
V12	AF Amp		6AT6	7BT	
V13	Audio Output		25L6GT	7AC	
V14	Vert Mult		12SN7GT	8BD	
V15	Vert Amp.		12SN7GT	8BD	
V16	Hor. Mult.		12SN7GT	8BD	
V17	Hor Amp		12SN7GT	8BD	
V18	HV Osc.		12SN7GT	8BD	
V19	HV Rectifier		1B3GT	3C	
V20	Bias Rectifier-Doubler		25Z6GT	7Q	
V21	Tripler		6X5GT	6S	
V22	Picture Tube		7JP4	14G	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	350		AF88J	UP4445		TVL-64	▲ Doubler
B	40	350						▲ Filter
C2A	30	450		AF862J4A #	UP9CJ1039		TVL-54	▲ Filter
B	15	450						# Filter
C	30	150						▲ Filter
C3	30	150		PRS150/30	BR3015		UT-301	Filter
C4A	100	150		AF101010D4A *	UP9BJ1038			▲ Filter
B	100	150		PRS150/50				▲ Filter
C5	30	150		PRS150/30	BR3015		UT-301	Filter
C6	30	150		PRS150/30	BR3015A		TVA-18	Filter
C7	4	25		PRS150/4	BR415		TVA-13	Stabilizing Cap.
C8	10	25		PRS25/10	BR102A		TVA-5	Sync. Sep. Cathode Bypass
C9	10	350			UP1535		TVA-21	Decoupling
C10	5000					811-005	29C1	Ant. Coupling
C11	5000					811-005	29C1	Ant. Coupling
C12	500					GP2K-500		RF Coupling
C13	5000					811-005	29C1	RF Screen Bypass
C14	1200					GP2L-0012		RF Filament Bypass †
C15	.82							RF Coupling
C16	22					GP1K-22		Mixer Grid Cap.
C17	5000					811-005	29C1	Mixer Decoupling
C18	270					GP2K-270		IF Coupling
C19	500					GP2K-500		RF Bypass †
C20	1200					GP2L-0012		Mixer Filament Bypass †
C21	1.5					NPOK-1.5		Osc. Coupling
C22	4.7					NPOK-4.7		Osc. Feedback
C23	4.7					NPOK-4.7		Osc. Feedback
C24	1200					GP2L-0012		Osc. Filament Bypass †
C25	1200					GP2L-0012		Osc. Filament Bypass †
C26	5000					811-005	29C1	Switch Bypass
C27	5000					811-005	29C1	Switch Bypass
C28	5000			1467-005	1D5D5	811-005	29C1	AGC Filter
C29	5000			1467-005	1D5D5	811-005	29C1	1st V. IF Decoupling
C30	5000			1467-005	1D5D5	811-005	29C1	1st V. IF Fil. Bypass
C31	270			1468-00025	5W5T25	GP2K-270	IFM-325	IF Coupling
C32	5000			1467-005	1D5D5	811-005	29C1	AGC Filter
C33	5000			1467-005	1D5D5	811-005	29C1	2nd V. IF Decoupling
C34	5000			1467-005	1D5D5	811-005	29C1	2nd V. IF Fil. Bypass
C35	5000			1467-005	1D5D5	811-005	29C1	3rd V. IF Cath. Bypass
C36	5000			1467-005	1D5D5	811-005	29C1	3rd V. IF Decoupling
C37	5000			1467-005	1D5D5	811-005	29C1	3rd V. IF Fil. Bypass
C38	.25	400		P488-25	GT4P25		TC-2	AGC Filter
C39	500			1468-0005	5W5T5	GP2K-500	IFM-35	IF Coupling
C40	5000			1467-005	1D5D5	811-005	29C1	DAGC Diode Filter
C41	5			1468-000005	5W5V5	NPOK-5	MS-55	V. Diode Filter
C42	5000			1467-005	1D5D5	811-005	29C1	Det. Filament Bypass
C43	.05	400		P488-05	GT4S5		TM-15	Video Coupling
C44	5000			1467-005	1D5D5	811-005	29C1	Decoupling
C45	.25	400		P488-25	GT4P25		TC-2	Video Coupling
C46	2.2							S. IF Coupling
C47	.02	400		P488-02	GT4S2		TM-12	1st S. IF Cath. Bypass
C48	.02	400		P488-02	GT4S2		TM-12	1st S. IF Decoupling
C49	360			1468-00035	5W5T3	GP2K-330	IFM-335	Diode Load Cap.
C50	5000			1467-005	1D5D5	811-005	29C1	RF Bypass
C51	1500			1467-0015	1W5D15	GP2L-0015	IFM-215	De-emphasis
C52	.02	400		P488-02	GT4S2		TM-12	Audio Coupling
C53	5000			1467-005	1D5D5	811-005	29C1	Vol. Control Isolation
C54	.006	600		P688-006	GT6D6	GP2M-0056	TM-26	Audio Coupling
C55	.01	600		P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C56	.02	400		P488-02	GT4S2		TM-12	Output Plate Bypass
C57	.05	400		P488-05	GT4S5		TM-15	Video Coupling
C58	.05	400		P488-05	GT4S5		TM-15	Sync. Coupling
C59	5000			1467-005	1D5D5	811-005	29C1	Integrator Net.
C60	5000			1467-005	1D5D5	811-005	29C1	Integrator Net.

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AUTOMATIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C61	.01	800		P888-01	GT6S1	GP2-335-01	TM-11	Vert. MV Feedback
C62	.1	600		P688-1	GT6P1		TM-1	Vert. Sweep Coupling
C63	.05	600		P688-05	GT6S5		TM-15	Vert. Discharge
C64	.02	400		P488-02	GT4S2		TM-12	Vert. Sweep Coupling
C65	.005	6000		7584-005	D5TH60D5		TVM-256	Vert. Sweep Coupling
C66	.005	6000		7584-005	D5TH60D5		TVM-256	Vert. Sweep Coupling
C67	220			1468-00025	5W5T25	GP2K-220	IFM-325	Differentiator
C68	100			1468-0001	5W5T1	GP1K-100	IFM-31	Hor. MV Feedback
C69	.01	600		P688-01	GT6S1	GP2-335-01	TM-11	Hor. Sweep Coupling
C70	100			1468-0001	5W5T1	GP1K-100	IFM-31	Hor. Discharge
C71	.005	6000		7584-005	D5TH60D5		TVM-256	Hor. Sweep Coupling
C72	.005	6000		7584-005	D5TH60D5		TVM-256	Hor. Sweep Coupling
C73	.05	600		P688-05	GT6S5		TM-15	HV Osc. Plate Decoupling
C74	1000	500		1464-001	2R5D1		MS-21	Fixed Trimmer ♦
C75	360			1469-00035				Fixed Trimmer
C76	1500			1467-0015	1W5D15	GP2L-0015	IFM-215	HV Osc. Grid Cap.
C77	.1	600		P688-1	GT6P1		TM-1	HV Osc. Fil. Bypass
C78	500	10000				410-500		HV Filter
C79	500	10000				410-500		HV Filter
C80	.05	400		P488-05	GT4S5		TM-15	Hor. Cent. Cont. Bypass
C81	.1	400		P488-1	GT4P1		TM-1	Line Filter §
C82	1200			1467-0015	1W5D15	GP2L-0012	IFM-215	AGC Filter †
C83	1500			1467-0015	1W5D15	GP2L-0015	IFM-215	V. Amp. Cath. Bypass

* Parallel sections to obtain desired capacity.
† Not used in all models.
‡ Some models use 500MMF in this application.
§ Some models use 5000MMF in this application.
♦ Some models use 750MMF in this application.
Omit bypass section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AUTOMATIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½	TRV-75	Q13-133	M-60-Z	Volume Control
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions
R2A	1 Meg.	½	TRV-77	Bll-137**		Vert. hold control, front } Dual Concentric
B	250KΩ	½		Bll-130**		Horiz. hold control, rear } Dual Concentric
C	Shaft End			E202**		Attach per instructions in "Concentrikit".
R3A	1000Ω	½	TRV-76	Bll-108**		Contrast control, front } Dual Concentric
B	25KΩ	½		Bll-120**		Brightness control, rear } Dual Concentric
C	Shaft End			E202**		Attach per instructions in "Concentrikit".
R4	5 Meg.	½	TRV-79	Q11-141	M-85-S	Horiz. Size control
R5	10 Meg.	½	TRV-78	Q11-143	M-86-S	Vert. size control
R6	10 Meg.	½	TRV-78	Q11-143	M-86-S	Vert. linearity control
R7A	5 Meg.	½	TRV-80	Q11-141		Focus control
B	Shaft		Not Req.	TQ		Attach to R7A per instructions
R8A	5 Meg	½	TRV-80	Q11-141		Horiz. centering control
B	Shaft		Not Req.	TQ		Attach to R8A per instructions
R9A	5 Meg	½	TRV-80	Q11-141		Vert. centering control
B	Shaft		Not Req.	TQ		Attach to R9A per instructions

** Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AUTOMATIC PART No.	IRC PART No.	IDENTIFICATION CODES: ALL RESISTORS ARE ±20% UNLESS OTHERWISE STATED:
R10	4700Ω 10%	½			RF Coil Shunt
R11	1000Ω 5%	½		BTS-1000-5%	RF Decoupling
R12	1 Meg.	½			RF Grid
R13	100Ω	½			RF Cathode
R14	560Ω 10%	½			Attenuator Network See Note 1
R15	560Ω 10%	½			Attenuator Network See Note 1
R16	390Ω 10%	½			Attenuator Network See Note 1
R17	4700Ω 10%	½			Mixer Coil Shunt
R18	1 Meg.	½			Mixer Grid
R19	1000Ω	½		BTS-1000	Mixer Decoupling
R20	27KΩ	½			Osc. Grid
R21	27KΩ	½			Osc. Grid
R22	47Ω	½			Osc. Cathode
R23	11KΩ 10%	½			1st Video IF Grid
R24	150Ω	½			AGC Network
R25	150Ω	½			AGC Network
R26	150Ω	½			AGC Network
R27	82Ω	½			1st Video IF Cathode See Note 2
R28	150Ω	½			1st Video IF Decoupling
R29	10KΩ 10%	½			2nd Video IF Grid
R30	82Ω	½			2nd Video IF Cathode See Note 2
R31	150Ω	½			2nd Video IF Decoupling
R32	11KΩ 10%	½			3rd Video IF Grid
R33	82Ω 5%	½			3rd Video IF Cathode
R34	100KΩ	½		BTS-100K	AGC Rect. Load
R35	2.2 Meg. 5%	½		BTS-2.2 Meg-5%	AGC Network
R36	100KΩ	½		BTS-100K	Voltage Divider
R37	50Ω	2		BW-2-47	Filament Dropping See Note 2
R38	8200Ω 5%	½		BTS-8200-5%	Video Det. Diode Load
R39	1 Meg.	½		BTS-1 Meg.	Video Amp. Grid
R40	10KΩ	½		BTS-10K	Bias Network
R41	1 Meg.	½		BTS-1 Meg.	Bias Network
R42	6800Ω	1		BTA-6800	Video Amp. Plate
R43	10KΩ	2		BT-2-10K	Video Amp. Screen Decoupling
R44	50Ω	2		BW-2-47	Filament Dropping See Note 2

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AUTOMATIC PART No.	IRC PART No.	IDENTIFICATION CODES
R45	4700Ω	½		BTS-4700	Voltage Divider
R46	150KΩ 5%	½		BTS-150K-5%	Picture Tube Cathode
R47	1 Meg	½		BTS-1 Meg	Sync. Sep. Grid
R48	6800Ω 10%	½		BTS-6800	Sync. Sep. Cathode
R49	220KΩ 5%	½		BTS-220K-5%	Sync. Sep. Plate
R50	200KΩ	½		BTS-180K	Phase Correction See Note 3
R51	560Ω	½		BTS-560	Bias Voltage Divider
R52	560Ω	½		BTS-560	Bias Voltage Divider
R53	82Ω 5%	½			Sound IF Cathode
R54	4700Ω	½			Sound IF Decoupling
R55	15KΩ	½		BTS-15K	Ratio Det. Diode Load
R56	15KΩ	½		BTS-15K	Ratio Det. Diode Load
R57	47KΩ	½		BTS-47K	De-emphasis
R58	10 Meg.	½		BTS-10 Meg.	AF Grid
R59	390KΩ	½		BTS-390K	AF Plate
R60	470KΩ	½		BTS-470K	Output Grid
R61	6.8 Meg.	½		BTS-6.8 Meg	Bias Network
R62	68Ω	½		BW-½-68	Output Cathode
R63	4700Ω	½		BTS-4700	Filter
R64	150Ω	½		BW-½-150	Filter
R65	4700Ω	½		BTS-4700	Integrator
R66	4700Ω	½		BTS 4700	Integrator
R67	1000Ω	½		BTS-1000	Vert. MV Cathode
R68	100KΩ	½		BTS-100K	Vert. MV Plate
R69	470KΩ	½		BTS-470K	Vert. MV Grid
R70	3 Meg.	½		BTS-3.3 Meg.	Vert. MV Plate
R71	4.7 Meg.	½		BTS-4.7 Meg.	Vert. Amp. Grid
R72	18KΩ	½		BTS-18K	Vert. Amp. Cathode
R73	150KΩ 5%	½		BTS-150K-5%	Vert. Amp. Grid
R74	2.2 Meg.	½		BTS-2.2 Meg.	Voltage Divider
R75	820KΩ 10%	1		BTA-820K	Vert. Amp. Plate
R76	820KΩ 10%	1		BTA-820K	Vert. Amp. Plate
R77	3 Meg.	½		BTS-3.3 Meg.	Feedback Network
R78	5.6 Meg.10%	1		BTA-5.6 Meg.	Vert. Deflection Load
R79	5.6 Meg.10%	1		BTA -5.6 Meg	Vert. Deflection Load
R80	100KΩ	½		BTS-100K	Horiz. MV Plate
R81	4700Ω	½		BTS-4700	Horiz. MV Grid
R82	1000Ω	½		BTS-1000	Horiz. MV Cathode
R83	220KΩ 5%	½		BTS-220K-5%	Horiz. MV Grid
R84	1.2 Meg.	½		BTS-1.2 Meg.	Horiz. MV Plate
R85	10KΩ 10%	1		BTA-10K	Filter
R86	4.7 Meg.	½		BTS-4.7 Meg.	Horiz. Amp. Grid
R87	4.7 Meg.	½		BTS-4.7 Meg.	Horiz. Amp. Grid
R88	47KΩ 10%	1		BTA-47K	Horiz. Amp. Plate
R89	47KΩ 10%	1		BTA-47K	Horiz. Amp. Plate
R90	4.7 Meg. 10%	1		BTA-4.7 Meg.	Horiz. Deflection Load
R91	4.7 Meg.10%	1		BTA-4.7 Meg.	Horiz. Deflection Load
R92	43Ω 10%	1			Osc. Filament Shunt
R93	60Ω	10			Filament Dropping (Wire Wound)
R94	7500Ω 5%	½			HV Osc. Grid
R95	68Ω	½			Parasitic Supp.
R96	100Ω	½			Parasitic Supp.
R97	68Ω	½			Parasitic Supp.
R98	100KΩ	1			HV Filter
R99	1 Meg.	½		BTS-1 Meg.	Voltage Divider
R100	3 Meg.	½		BTS-3.3 Meg.	Voltage Divider
R101	3.3 Meg.10%	1			Voltage Divider
R102	3.3 Meg.10%	1			Voltage Divider
R103	4.7 Meg.10%	1			Voltage Divider
R104	4.7 Meg.10%	1			Voltage Divider
R105	1200Ω	1		BW-1-1200	Filter
R106	3.9 Meg 10%	1			Voltage Divider
R107	3.9 Meg 10%	1			Voltage Divider
R108	3 Meg.	½		BTS-3 3 Meg	Voltage Divider
R109	3 Meg.	½		BTS-3 3 Meg.	Voltage Divider
R110	680Ω	1		BW-1-680	Filter
R111	18Ω	5			Surge Limiter (Wire Wound)

Note 1. Use for local reception only.
Note 2. Not used in all models.
Note 3. Some models use 180KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AUTOMATIC PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC at .05A	133VAC .017ADC						

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AUTOMATIC PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No
T2	1.5Ω	650Ω	38Ω	0Ω				

AUTOMATIC
MODEL TV-P490

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AUTOMATIC	STANCOR	MERIT	CHICAGO	
	PRI.	SEC.	PRI.	SEC.	PART No.	PART No.	PART No.	PART No.	
T3	3KΩ	4Ω	180Ω	.6Ω		A-3876 §	A-2928 §	RO-2 §	§ Bend mounting tabs down and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	AUTOMATIC PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	4Ω		ST-113 # MOD .P4-X	4A1	# Fabricate new mounting bracket.
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∽)	AUTOMATIC PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.066A	150Ω	6 Henries		C-2303 †	C-2977 †	R-885 †	† Drill one new mounting hole.

COILS (RF-IF)

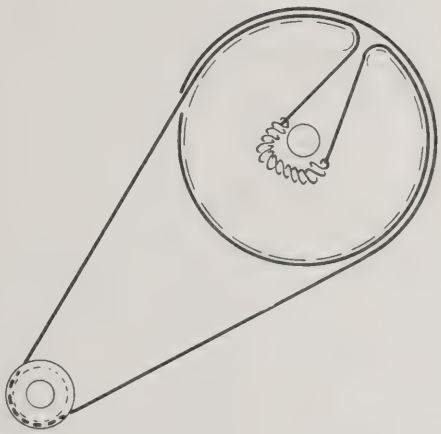
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	AUTOMATIC PART No.	MEISSNER PART No.	
L2	Ant. Input	.2CT				
L3	RF Strap Inductance	0Ω				
L4	RF End Inductance	0Ω				
L5	RF End-Inductance	0Ω				
L6	RF Plate Chk.	0Ω				
L7	Osc. Coils	0Ω				
L8	1st Video IF	.2Ω				
L9	2nd Video IF	.2Ω				
L10	3rd Video IF	.1Ω	.1Ω			
L11	4th Video IF	.1Ω	.1Ω			
L12	Peaking	9.5Ω				160 Microhenries, Wound on 33KΩ resistor.
L13	Peaking	20Ω				520 Microhenries
L14	Peaking	10Ω				160 Microhenries, Wound on 15KΩ resistor.
L15	Peaking	20Ω				520 Microhenries.
L16	Sound IF Trap	2Ω				
L17	Ratio Det. Transformer	4Ω	.8Ω			
L18	Fil. Choke	0Ω				
L19	Fil. Choke	0Ω				

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	AUTOMATIC PART No.	SYLVANIA PART No.		
M1	.155A		NE-5		

MISCELLANEOUS

ITEM No.	PART NAME	AUTOMATIC PART No.	NOTES
M2	RF Tuner		



FINE TUNING CORD STRINGING

BRUSH SOUNDMIRROR
MODEL BK416

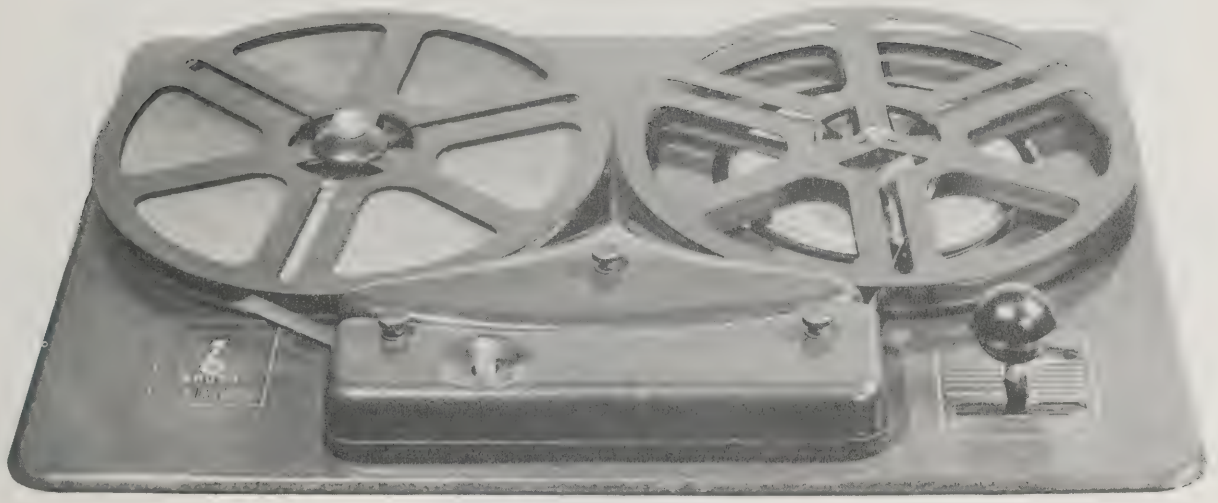


FIGURE 1

GENERAL INFORMATION

The Brush Soundmirror Model BK416 recorder mechanism is designed to magnetically record on a standard 7″ reel, .248″ width ribbon. A standard 7-inch reel of ribbon provides approximately thirty minutes of recording and playing time. The "Magic Ribbon" used with Model BK416 is a paper ribbon coated with a magnetic material (black iron-oxide) and has a breaking load of 6 lbs. A small diameter capstan attached to a pulley and a balanced flywheel provide a constant drive speed for the ribbon; i.e., when the ribbon is pressed against the capstan by the pressure wheel while the mechanism is in the record and play position.

The recorder mechanism incorporates two manual controls and two automatic controls:

(A) One manual control lever is used for the purpose of shifting the mechanism to its proper position for the following operations: (a) "Play or Record," (b) "Rewind," (c) "Stop," (d) "Fast-Forward," (e) "Fast-Reverse."

(B) The other manual control, the "Erase Pin," which, when pressed while shifting the "Control Lever" to the "Record" position, locks the erase head in position against the ribbon. The latter control is used only during the recording operation, or to ease any previous recording from the ribbon.

(C) The two automatic controls: *The Rewind Trip Lever,* when triggered, causes the ribbon to rewind from the Takeup Reel onto the Supply reel. *The Takeup Trip Lever,* when triggered, causes the reels to stop at the end of the automatic rewind operation.

Power Supply is 105 to 120 Volts A.C., 60 Cycle.

Manufactured by: **THE BRUSH DEVELOPMENT COMPANY**
3405 Perkins Ave. • Cleveland 14, Ohio

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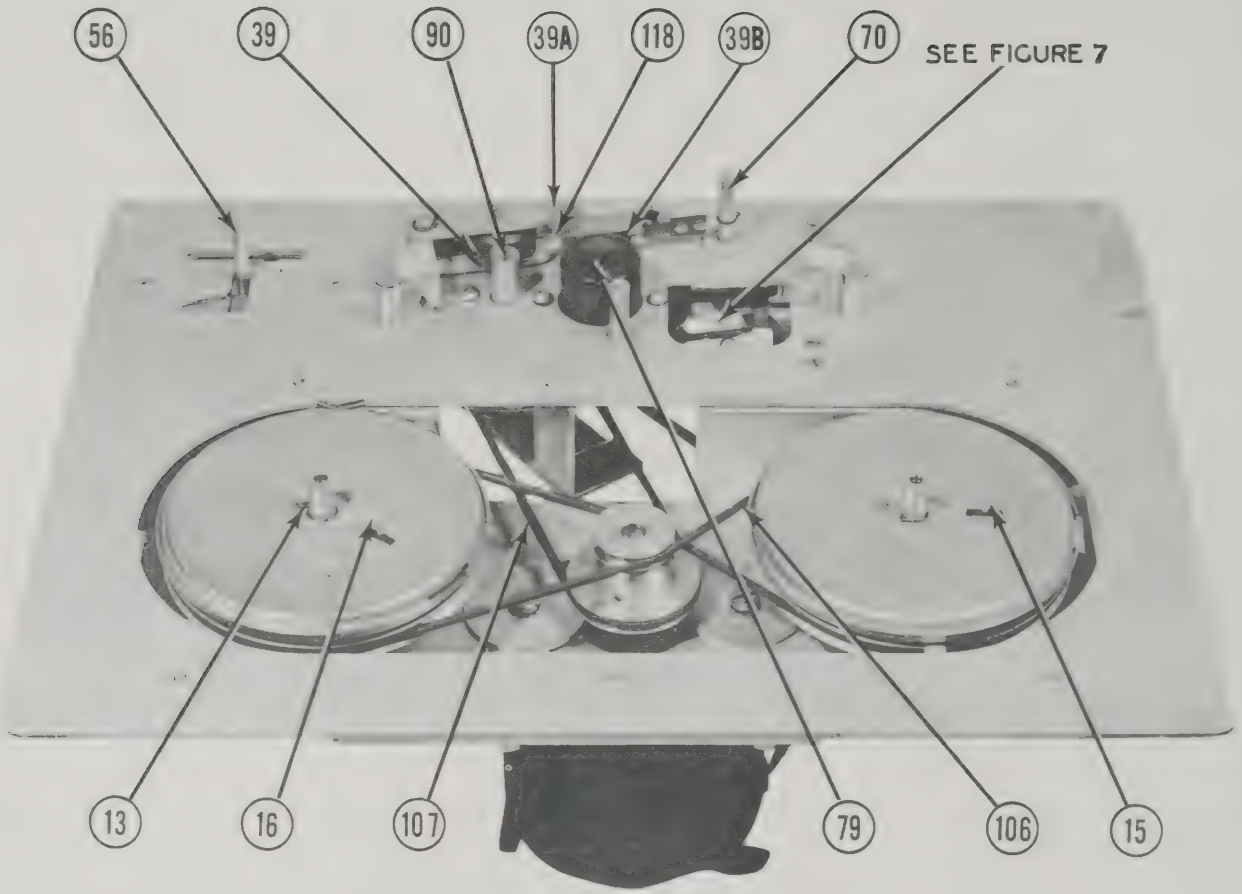

FIGURE 2

OPERATING INSTRUCTIONS

Threading of Ribbon

(a) Place a full reel of ribbon on the left hand turntable so that the ribbon comes off the left side of the reel. Be sure the magnetic coating on the ribbon faces the center of the reel. *(In the Brush "Magic Ribbon," this coating is the black side.)*

(b) Place the empty reel on the right-hand turntable. Be certain that the key pin (14A) of each turntable fits into the key slot (3B) of each reel (see exploded view). Correct positioning allows proper action of each automatic trip lever (110) and (111) figures 3 and 4.

(c) Grasp the free end of the ribbon in the right hand, and with the left hand guide the ribbon into the "Recording Slot," from the left side to the right side, keeping the slack adjusted until the ribbon rides smoothly when pulled through the slot.

(d) Thread the free end of the ribbon into the hub of the takeup reel. Give the reel one or two complete turns, by hand, to allow the ribbon to grip around the hub of the reel and take up the slack.

To Repair or Splice Tape

In case the tape is broken accidentally, or it is desired to edit the recording, a splice may be made with Scotch tape. *It is suggested that colored Scotch tape be used to mark the tape to show the desired divisions or passages.* Do not use medicated adhesive tape as the adhesive material is not suited for this purpose. The Scotch tape should be applied to the reverse, or uncoated, side of the recording ribbon. The edges of the splice should be trimmed with a small pair of scissors, or a knife, to bring the width of the splice to that of the rest of the recording tape so it will pass through the heads without interference.

Recording

Shift the control lever (56) up and to the right, as far as possible, to the "Record" posi-

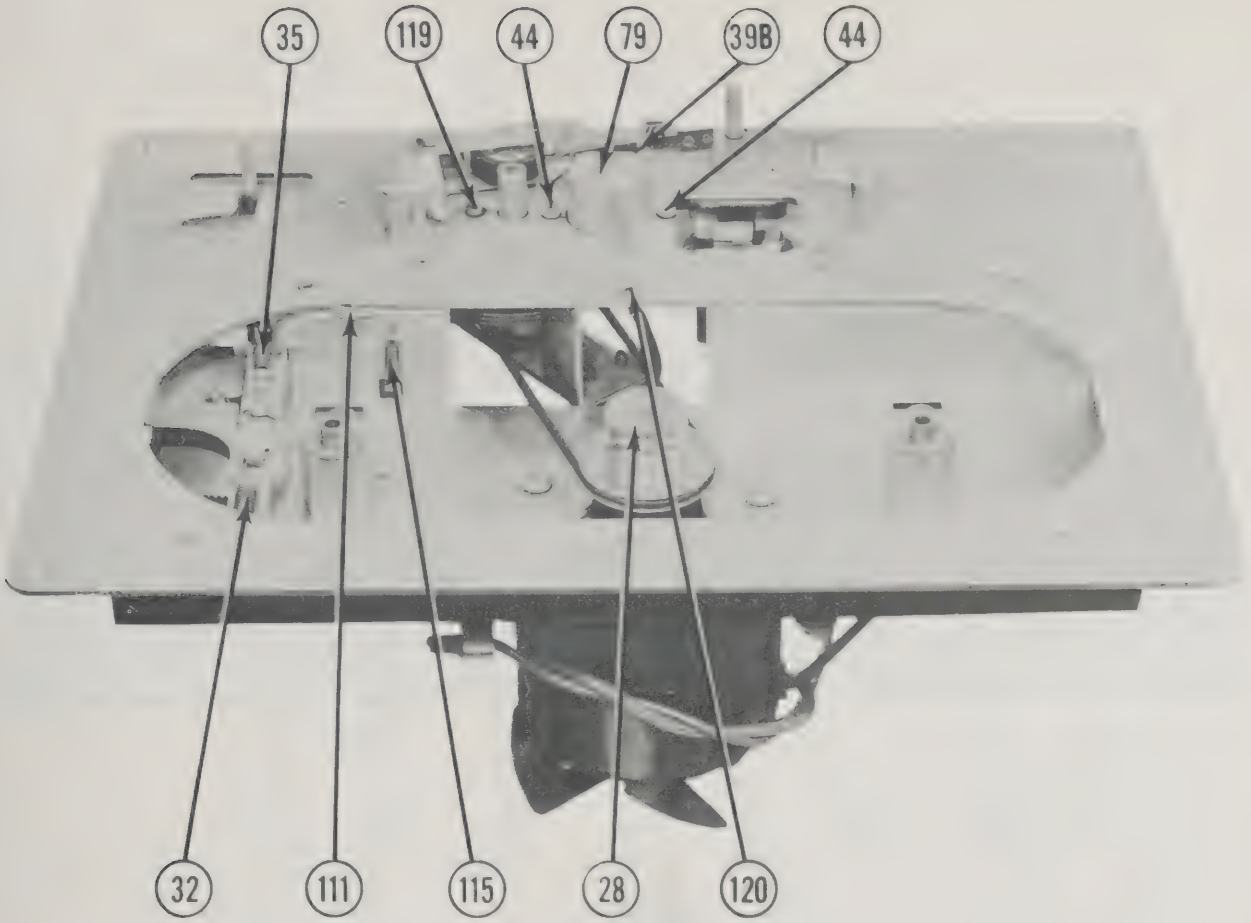

FIGURE 3

tion while pressing on the erase pin (70) which locks the erase head against the ribbon. This operates the switch (49), which causes the Volume Indicator of the electrical unit to operate; also, the erase head against the ribbon erases any previous recording.

Playback

Rewind the ribbon to the start of the recording (see paragraph on "Rewind"). Shift the control level up, and to the right, as far as possible, to the "Play" position. The mechanism is now ready to operate.

To Stop

The ribbon may be stopped at any point by shifting the control lever to the position marked "Stop."

Rewind

If a recording is allowed to continue to the end, the ribbon will automatically rewind. When desiring to rewind the ribbon before reaching the end, the control lever may be moved to the position marked "Rewind," being careful not to shift the lever to the "Stop" position. This sets the machine for rewind and the lever can then be released. The lever must be moved to the "Stop" position before returning it to the "Record" or "Play" position.

Fast Forward or Fast Reverse

The ribbon may be run rapidly in either direction by moving the control lever to the proper position: "Fast Forward" at the bottom right or "Fast Reverse" at the bottom left (figure 1). The lever must be held in position during either operation. If it is desired to stop the ribbon at any point, after it has attained a fairly high speed in either direction, the lever should be held in the opposite direction for a moment as a breaking action and to prevent "slackening" in the ribbon. As the reels come to rest, the lever should then be moved to the "Stop" position to prevent winding in the opposite direction.

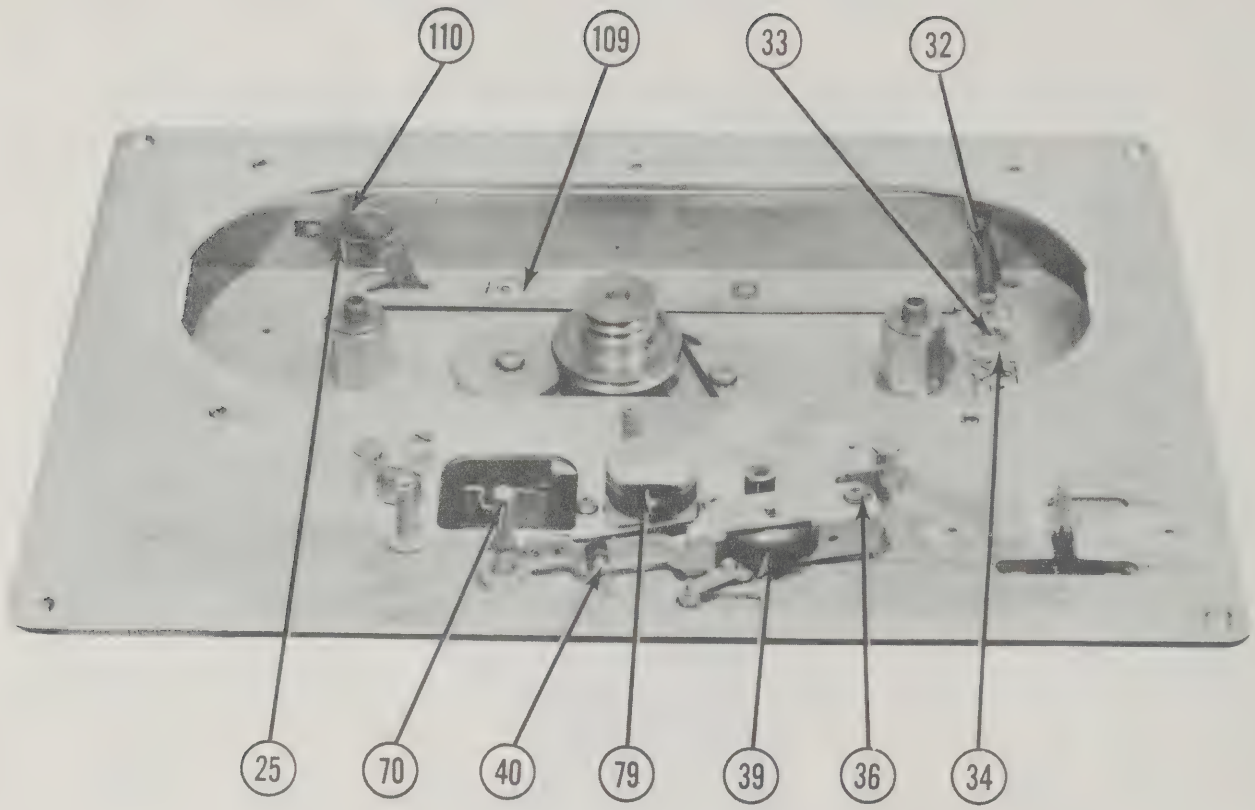

FIGURE 4

MECHANICAL FUNCTION

Drive Mechanism

The drive mechanism includes the following:

1. A single motor (77) which drives both the capstan and the reeling mechanism. It is an induction-type motor and is resiliently mounted on a bracket which can be shifted in its position for the purpose of adjusting the tension of the rubber drive belts. A fan is attached to the drive motor shaft to cool the motor.

2. Rubber belts (106 and 107) couple the drive pulley to the capstan assembly and the reeling mechanism. The smaller belt (107) drives the capstan and the larger belt (106) drives the reels.

3. A small diameter capstan (90 figure 5) attached to a pulley and a balanced flywheel provide a constant drive speed for the ribbon. The capstan revolves in two bearings, which are of the "Oilite" type and require no additional lubrication. The bottom bearing is of the self-aligning type.

4. A pressure wheel (39 exploded view and figure 2) and a pressure pad (39B exploded view and figure 2) are assembled on a bracket (39A), which is engaged by the control lever (56) to press the ribbon against the capstan (90) and the record-play head (79), respectively, during the record or play operation. The rubber tire pressure wheel has an "Oilite" bearing requiring no additional lubrication.

Reeling Mechanism

The reeling mechanism consist of two turntables (14) and two clutch assemblies (17 and 19) mounted on the two reel shafts (18) and two pulleys (20) mounted on bearings (31), all of which are driven by the motor through the drive belt (106).

The two turntable assemblies consist of two cups fitted together to serve three purposes:

A PHOTOFACT "EXPLODED" VIEW
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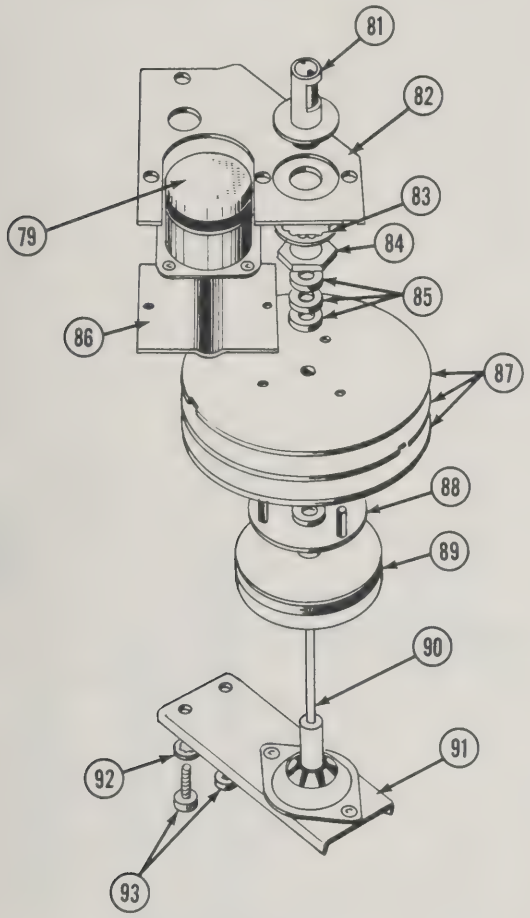

FIGURE 5

1. The upper cup (14) which supports the reels.

2. The upper and lower cups fitted together to house the rewind trigger (15) and the takeup trigger (16).

3. The lower cup to form the clutch facing which contacts the felt disc (19) when the turntable assembly is lowered.

The clutch assembly, actuated by the clutch-raising lever (108) and pin (46), is considered to be engaged when the felt disc contacts the facing of the cup. While engaged, the rewind clutch turns clockwise and the takeup clutch turns counterclockwise.

The two triggers (15 and 16) are for the purpose of tripping the automatic control levers (110 and 111 figure 3 and 4), respectively.

The rewind trigger (15), which is held in a cocked position by the ribbon on the reel, is released when only 20 to 40 turns of ribbon remain on the reel. When released, the trigger trips the rewind trip lever (110) which actuates the control mechanism to rewind the ribbon automatically.

The takeup trigger (16) is held in a cocked position by the first turn of ribbon on the takeup reel, and when the automatic rewinding is completed, the ribbon leaves the reel and releases the trigger (16). When the trigger is released, the centrifugal force causes the trigger to protrude through the opening in the outer edge of the takeup table and strike the trip lever (111), which actuates the control mechanism, to stop the motor.

Control Mechanism

The control mechanism is actuated by two control levers, which are operated manually, and two trip levers, which are operated automatically by the reeling mechanism triggers. The manual controls are: The control lever (56) and the erase pin (70). The control lever moves the corresponding engaging levers to the following positions:

1. "Play or Record" position: Placing the control lever in this position causes:

(a) The latch cam slide (34 figure 4), which actuates the trip lever latch (33 figure 4), and the trip bar (109) to engage and set the takeup trip lever (111 figure 3) and the rewind trip lever (110 figure 4).

(b) The head locking slide (112 figure 6) to lock the erase head in position against the ribbon (when the erase pin (70) is pressed), the pressure wheel to bear against the capstan (90 figure 2 and 5), and the pressure pad (39B) to bear against the record head (79).

(c) The clutch lever (113 figure 8), which couples to the raising lever assembly (86), to engage the takeup clutch, disengage the rewind clutch, and close the motor switch contacts.

(d) The latching gate (114 figure 10) to lock the control mechanism in "Play or Record" position until released

A PHOTOFACT "EXPLODED" VIEW

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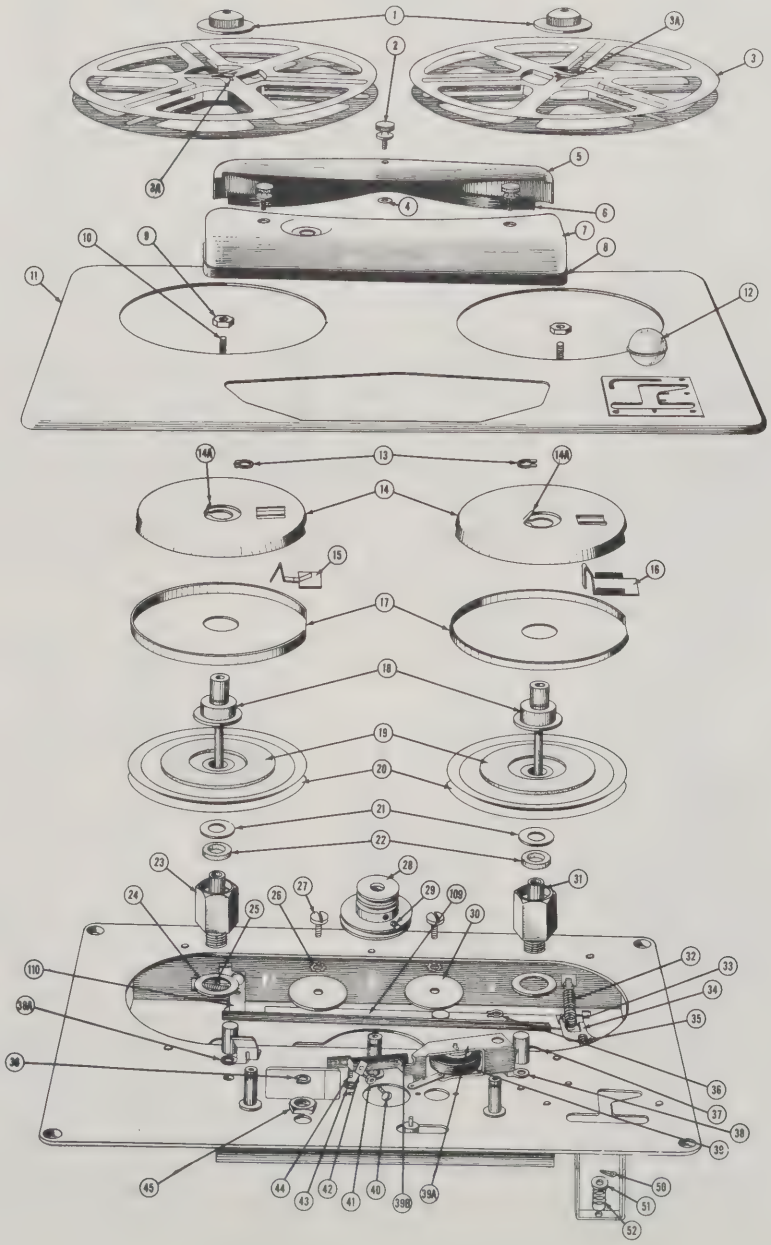
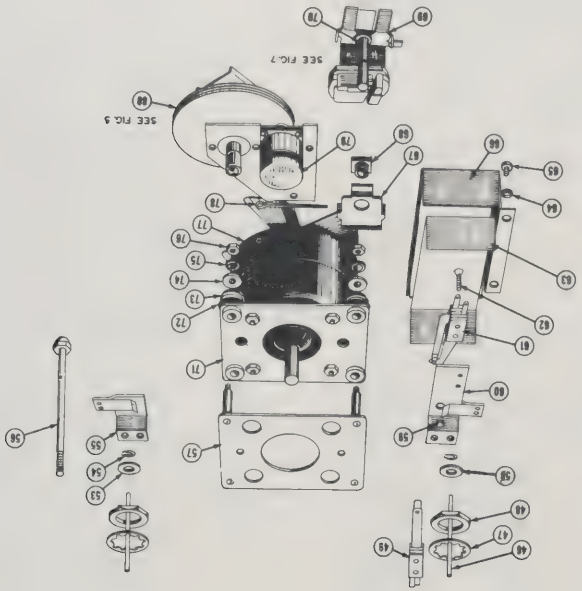



SEE FIG.7
SEE FIG.5

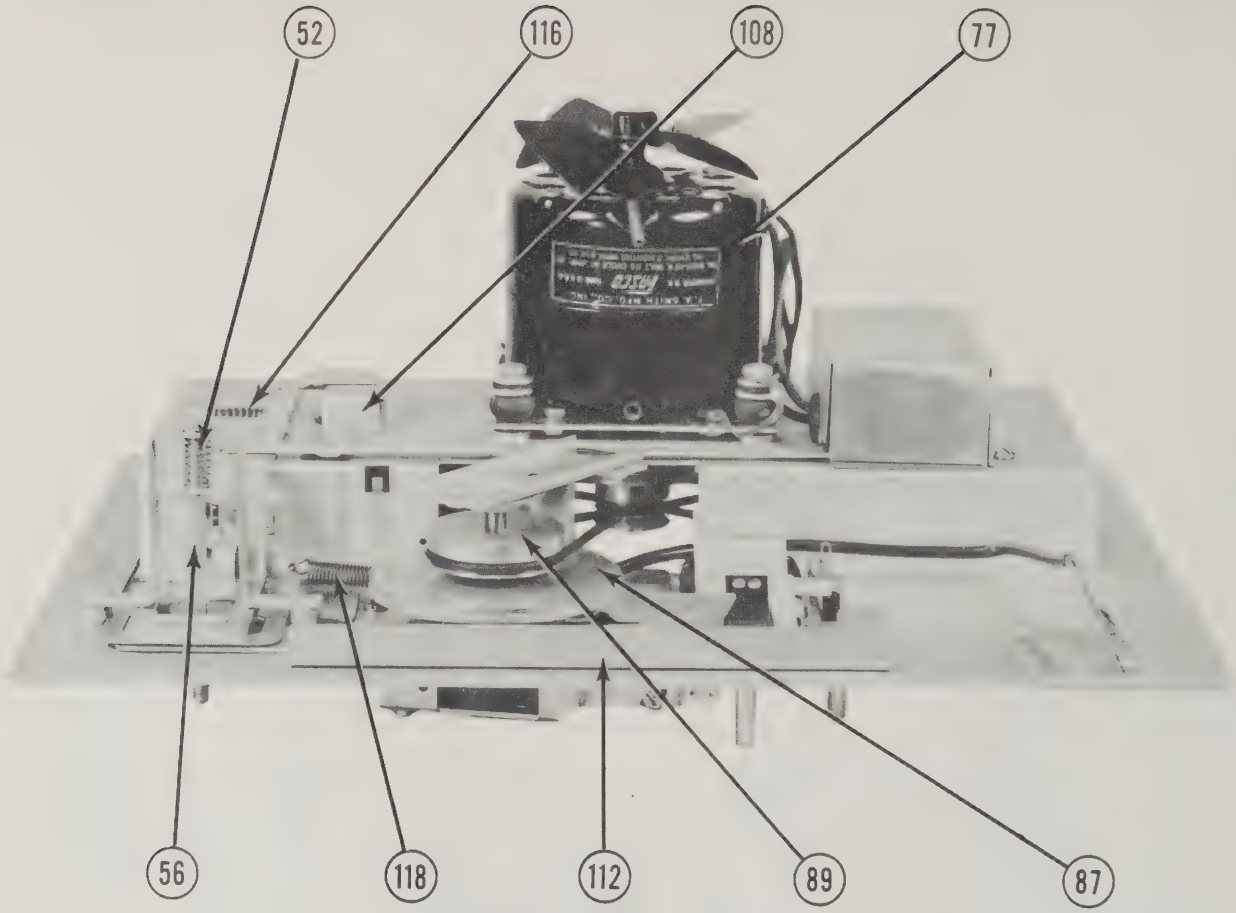


FIGURE 6

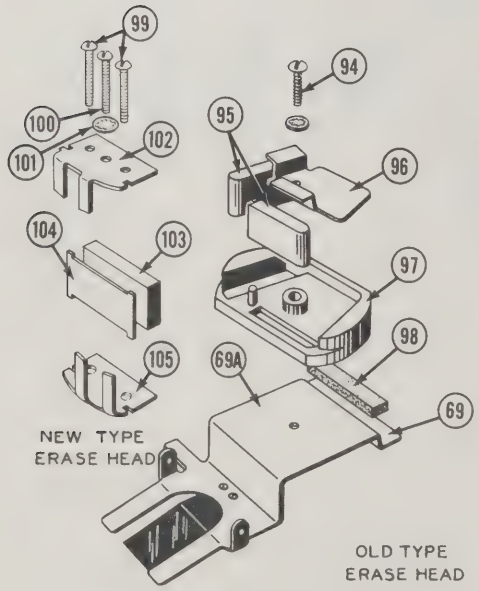


FIGURE 7

either manually (by placing control lever in "Rewind" or "Stop" position) or automatically (by action of the rewind trip lever). The latching gate is moved to the locking position by a spring (115 figure 10). The gate should be lubricated periodically with light oil (SAE-10) to prevent binding.

2. "Rewind" Position: Placing the control lever in the "Rewind" position initiates the following actions:

(a) The latching gate (114 figure 10) is moved half-way out of its locked position.

(b) The spring (116 figures 8 and 10) then moves the raising lever assembly (108 figures 8 and 10) to its extreme opposite position to disengage the takeup clutch and engage the rewind clutch to cause the reels to turn in the reverse direction and rewind the ribbon from the takeup reel onto the supply reel.

(c) The pressure wheel (39) is moved away from the capstan (90) to allow free movement of the ribbon during the rewind operation.

(d) The head locking slide (112 figure 6) is moved to release and drop the erase head from its engaged position after completion of a recording.

3. "Stop" Position: Placing the control

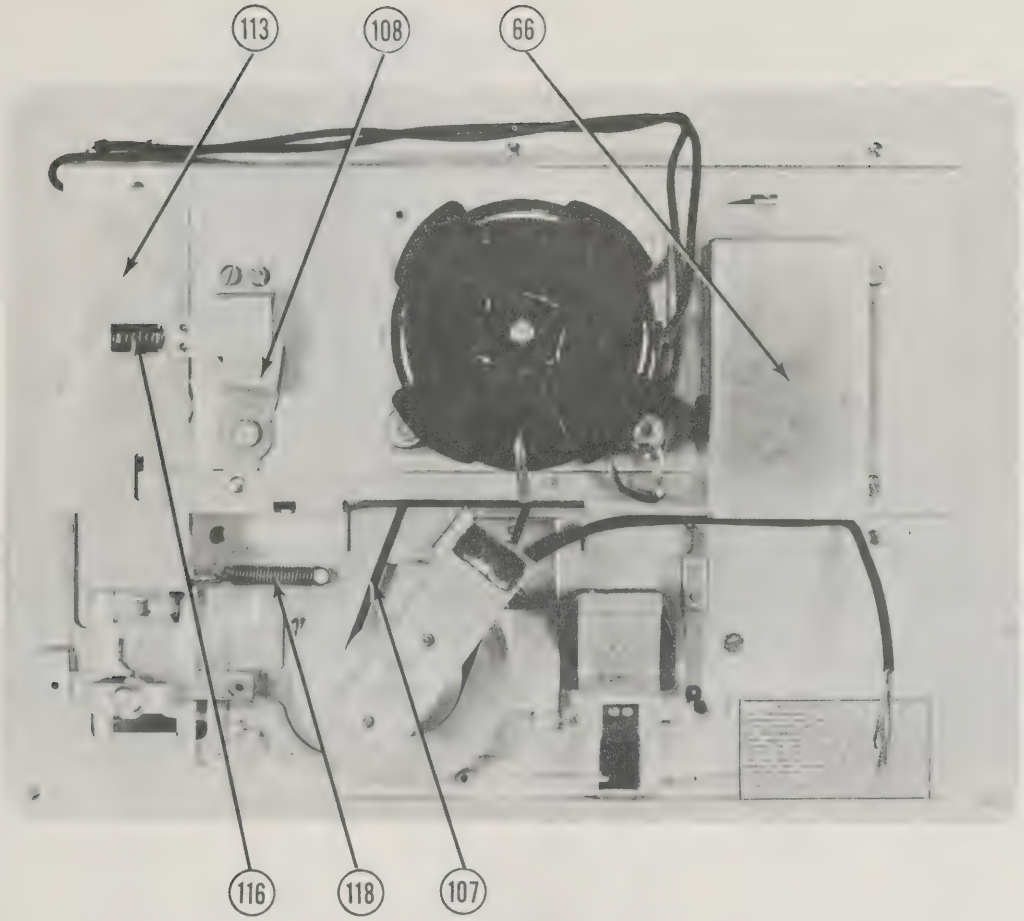


FIGURE 8

lever in the "Stop" position releases all levers remaining engaged, and opens the motor switch contacts. The raising lever assembly is moved to a position which allows both clutches to engage and produce a friction brake to stop the reels quickly.

4. "Fast-Forward" Position: Placing the control lever in the "Fast-Forward" position causes the takeup clutch to engage, the rewind clutch to disengage, the motor switch contacts to close, and the ribbon to wind forward rapidly.

5. "Fast-Reverse" Position: Placing the control lever in the "Fast-Reverse" position causes the rewind clutch to engage, the takeup clutch to disengage, and the motor switch contacts to close and cause the ribbon to rewind rapidly.

REMOVAL AND REPLACEMENT OF MAJOR PARTS

Record-Play Head

Removal and replacement of the Record-Play head is as follows:

1. Rewind all the ribbon and remove reels from their turntables.

2. Remove trim covers (5 and 7).

3. Remove the record-play head mounting screws (44 figure 3).

4. Remove the capstan drive assembly mounting screws (119 and 120 figure 3), and carefully lower the assembly away from the panel enough to slip the record head out of the hole.

5. Assemble the capstan drive assembly and the Record-Play head (79) by placing the head and the mounting clamp (86) between the flywheel and the bracket.

6. Hold the assembly in the left hand and position it onto the panel while tightening the flat head screw (120 figure 3) enough to hold the drive assembly until the other mounting screws are placed in position.

7. Rotate the head until the lamination of the head contacts the ribbon properly and alternately tighten screws (44) until the head is aligned vertically when the screws are completely tightened.

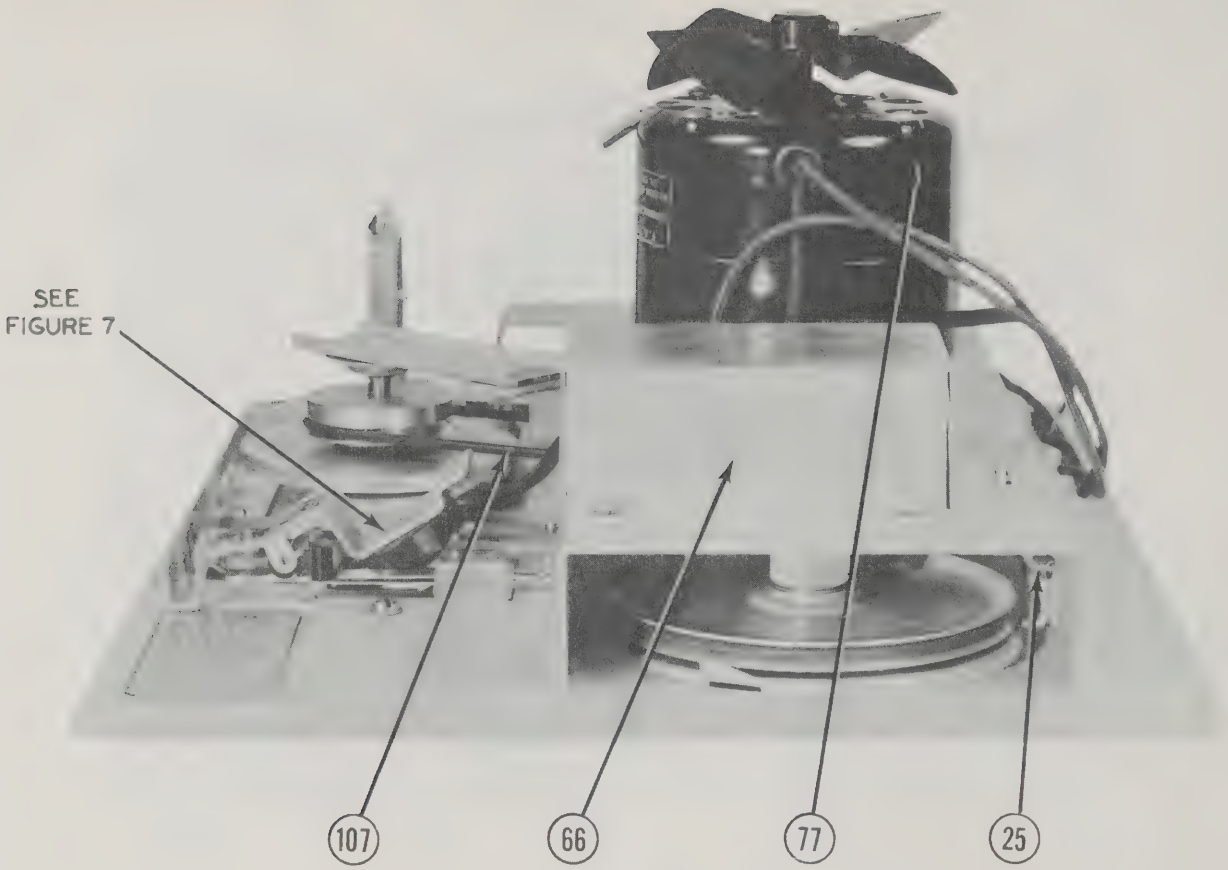


FIGURE 9

8. Tighten screws (119) and (120) completely.

Erase Head

Replacement of the erase head will only become necessary when the magnets are too weak to thoroughly erase any signal from the ribbon, or if any part becomes damaged.

1. Remove power from unit.
2. Remove the trim covers (5 and 7).
3. Press down on the erase pin (70) and move the control rod (56) to the Record-Play position. This is to lock the erase head in an accessible position.
4. Remove the screw (94 or 100 figure 7) which holds the erase head to its bracket:
   (a) In case of the old head, the parts will fall apart when the screw (94) is removed; however, if the new type head is used, the parts are held together by the two screws (99).
5. Assemble the new or old parts as shown in figure 7.
   (a) If a new head is to be used, the bracket (69) must be replaced by bracket (69A), or a hole must be drilled in the bracket (69) in the approximate position shown in figure 7, and tapped for a No. 4-40 screw.
6. Replace the trim covers.

Replacement of Capstan Drive Assembly

1. Remove the drive belt (107).
2. Remove the two Allen head screws (93 figure 5).
3. Carefully pull the capstan spindle and flywheel assembly out of upper bearing (81). This allows the replacement of these parts only. To replace the upper bearing and bracket assembly, follow the procedure as outlined in "Record-Play Head."
4. Replace the parts or assemblies in reverse order as outlined above.
5. Replace belt.
6. Check for binding in bearings. If binding occurs in lower bearing, realign the bearing by tapping lightly on all its sides.

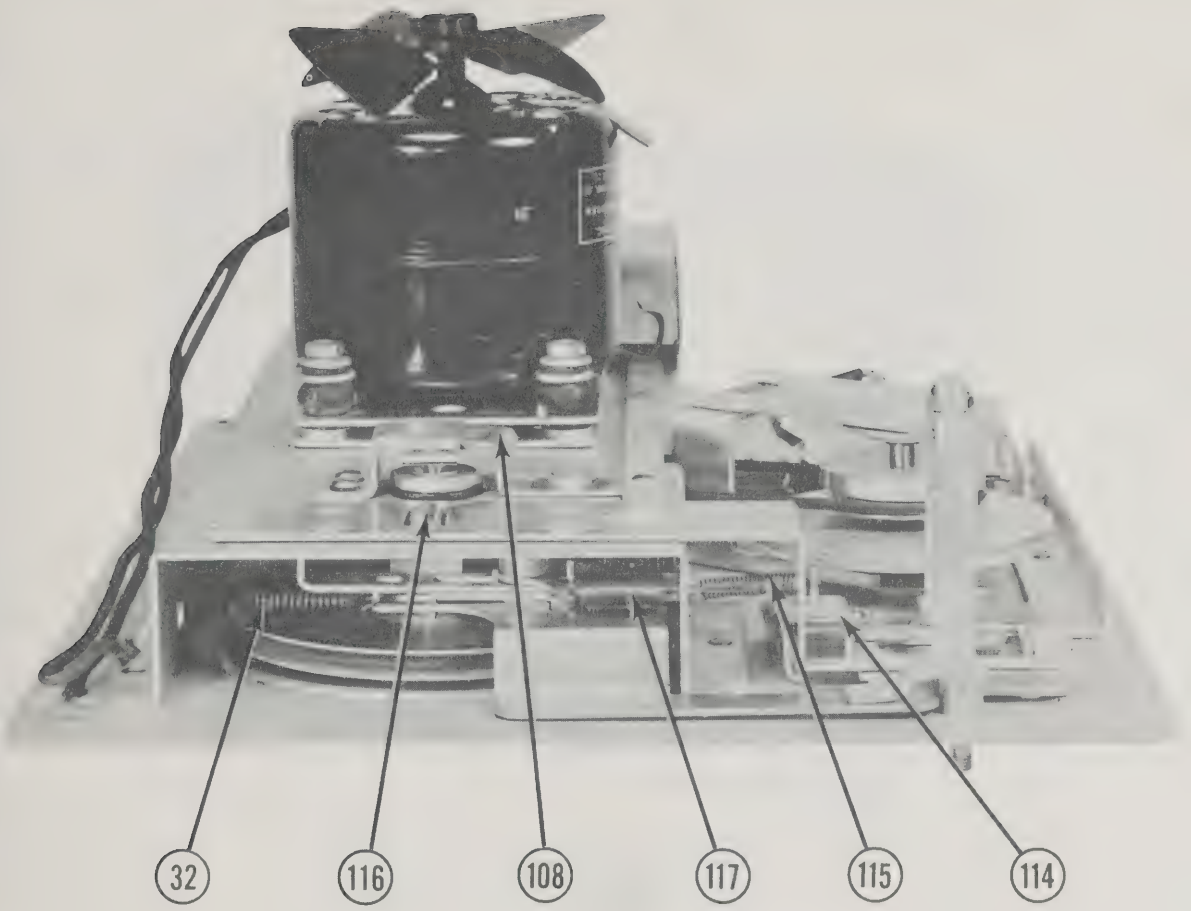


FIGURE 10

NOTE: Any binding or excessive friction in any part of the drive assembly will result in a speed variation of the ribbon and thus produce a pitch variation known as "flutter."

The capstan flywheel is made of three identical discs which rotate on the same axis. Each disc contains an indexing notch on its circumference. These notches are spaced 120° apart to provide a balance in the flywheel and produce a minimum of "flutter" during recording or reproduction.

Pressure Wheel Assembly

1. Remove the trim cover (7) and the retaining ring (36 figure 4).

2. Lift assembly off the post, being careful not to damage the pressure wheel spring (118).

3. Slide the spring out the end of the bracket. The wheel and shaft should then come out easily.

4. Replace parts in reverse sequence of 1, 2, and 3.

Pressure Pad Replacement

The friction between the pressure pad (39B) and the ribbon will, in time, wear the felt pad. When it becomes necessary to replace this pad, it is recommended that a good cement be used and that care be taken to prevent any cement from getting on the face of the felt which contacts the ribbon.

After the replacement of the pad, the pressure of the pad against the ribbon should be adjusted by the screw (40 figure 4).

Disassembly and Replacement of Turntable Assembly

1. Remove the retaining ring (13 figure 2).

2. Lift the turntable assembly from the reel post (18). The assembly may be divided into the upper cup (14), the lower cup (17), and the tripping trigger (15 and 16).

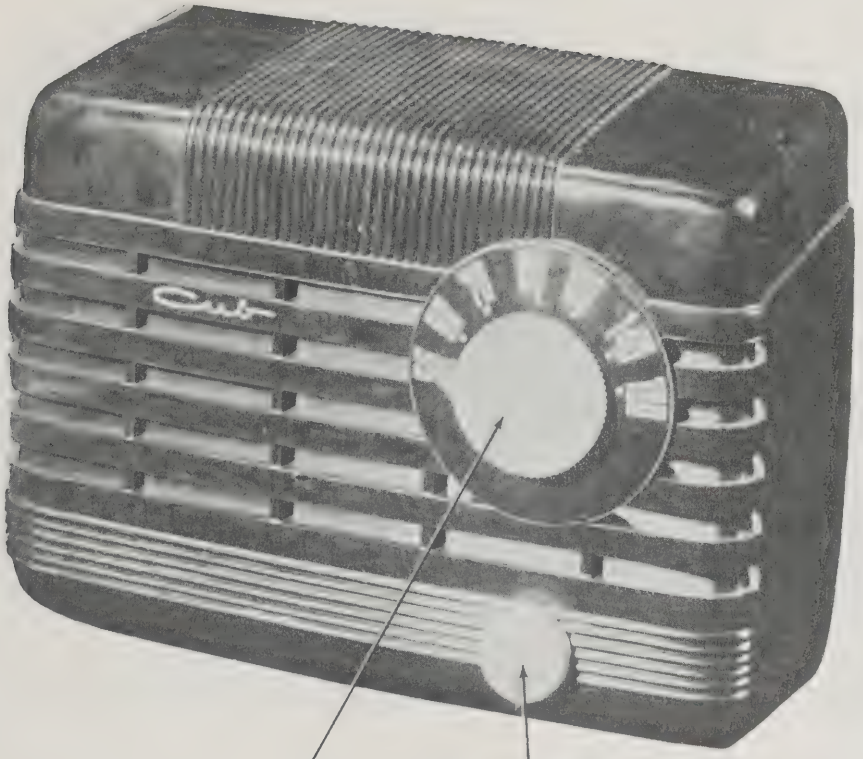
3. Replace either trigger if damaged.

4. Reassemble parts as shown in the exploded view.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	107185	Reel hold-down clamping nut
2		Knurled thumb screw (included with items 5 and 7)
3	BK-921	Ribbon reel, empty
4	106516	Flat-washer, thumb screws 3/8" diameter x .015 thickness; hole .120" diameter
5	206517-501	Trim cover (includes items 2 and 6)
6	106827-1	Rubber moulding
7	306518-501	Trim cover (includes items 2 and 8)
8	106827-2	Rubber moulding
9		Hex nut: No. 8-32, small; 7/32 across flats, 3/32" thick
10		Allen head set screw; No. 8-32 x 5/8" long
11	306503-501	Panel trim cover
12	106296	Control shift knob
13	104307-5	Retaining ring "Truarc" I.D. .281"
14	206147	Reel drive cup: reel support
15	106423-501	Rewind trigger
16	106152	Take-up trigger
17	206148	Clutch cup
18	106351-501	Reel post; sub-assembly
19	106146	Felt, clutch facing
20	106366-501	Clutch pulley: sub-assembly
21	106212	Clutch thrust bearing: oilite; .750" O.D., .315 I.D. x .031 thick
22	106213	Oil retainer felt; 5/8" O.D., 5/16" I.D., 3/32" to 1/8" thick
23	106365-501	Clutch bearing housing
24	106527	Spacer washer for clutch bearing washer (deleted on later units)
25	106404	Extension spring (for rewind trip lever)
26		External lock washer: No. 10 for motor mounting
27		Screw: No. 10-24 x 3/8; shakeproof: motor mounting
28	106472	Pulley, belt drive
29		Set screw: No. 8-32 x 1/4; hollow cup
30	106120-1	Motor mounting washer
31	105711-3	Reel post bearing
32	106615	Spring, for trip bar extension return
33	206159	Trip lever latch
34	206112	Latch cam slide
35	106617	Spring for trip lever latch
36	104307-1	Retaining ring: "Truarc" No. 5100-25; I.D. .225"
37	106262	Ribbon guide post
38	206321	Right-hand ribbon guide
38A	206320	Left-hand ribbon guide
39	106125	Pressure wheel
39A	206444-501	Pressure wheel bracket
39B	106129	Felt-pressure pad
40		Pressure pad adjustment screw No. 4-40 x 1/2
41		Hex nut No. 4-40; pressure pad adjustment
42	106454-1	Speed nut, Tinnerman: pressure pad adjustment
43		Internal lockwasher No. 6
44		Record head mounting screw No. 6-32 x 3/8" R.H.M.S.
45		Hex nut 3/8-32
46	106117	Clutch lifter pin
47		Internal lockwasher, 1/2"
48	106157	Hex nut 1/2-20 N.C.
49	106916-501	Switch lever: renders volume indicator inoperative until erase head is engaged, S.P.D.T.
50		Cotter pin: 1/16" diameter x 7/16" long
51		Plain washer No. 8
52	106119	Shift rod spring
53		Plain washer No. 8
54	104307-6	Retaining ring "Truarc" No. 5100-18; .170/.164 I.D
55	106407-501	Clutch lifter bracket, takeup
56	106270-501	Control lever rod
57	106163-501	Motor shock mounting plate
58		Flat washer
59	7553	Steel ball 3/16 diameter for switch (61)
60	206409-501	Clutch lifter bracket, rewind
61	106317-501	Switch, lever: operates AC motor when actuated by control levers
62		Screw, machine No. 5-40 x 1/2"
63	106401	Insulator, switch cover
64		Internal lockwasher No. 6
65		Screw, type "7": No. 6 x 1/4" round head
66	206293	Switch cover
67	106170	Erase head bracket hinge
68	106143	Erase pin sleeve
69	106408-501	Erase head mounting bracket
69A	107272-501	Erase head bracket (new type) (see figure 7)
70	106142	Pin, actuates erase head bracket
71	106122	Motor mounting bracket
72	104213-4	Rubber mount
73	106179	Spacer washer: motor vibration
74	106671	Plain washer .172" I.D. x 1/2" O.D. x .049" thick
75		Internal lockwasher No. 8
76		Hex nut No. 8-32
77	206322	Motor 115v. AC, 60 cycle
78		Cotter pin
79	306784-501	Record-reproducer head
80	206460-501	Drive capstan: sub-assembly (includes spindle, spindle bearing, flywheel, pulley, lower pulley, and mounting bracket)
81	106364-501	Capstan spindle bearing
82	206139	Bracket, capstan drive mechanism
83		Internal tooth lockwasher No. 3/8"
84		Hex nut, No. 3/8-32
85	106173	Flat washer
86	106269	Cable clamp
87	106137	Flywheel disc
88		
89	106338-501	Drive capstan, sub-assembly (replace as one unit)
90		
91	106394-501	Capstan bottom bearing bracket
92		Spring lock washer No. 10
93		Cap screw No. 10-32 x 3/8"
94		No. 4-40 x 1/2 R.H.M.S. For early models Internal lockwasher No. 4 early models
95	106469	Magnet, erase head
96	106331	Clamp, erase magnet (old type)
97	206332	Erase head mounting base (old type)
98	11293-2	Felt pad for erase head bracket
99		R.H.M.S. No. 5-40 x 11/16" cad. plated
100		R.H.M.S. No. 4-40 x 3/4" brass
101		Internal tooth lockwasher No. 4 bronze
102	206931	Polepiece, top: for new type erase head
103	106939	Erase head magnet: for new type head
104	106930	Polepiece spacer, brass: for new type erase head
105	206932	Polepiece, bottom: for new type erase head
106	106340	Rubber belt: clutch drive
107	106339	Rubber belt: motor drive
108	206410	Clutch raising lever assembly
109	206392-501	Trip lever bar—sub-assembly
110	106153	Rewind trip lever
111	106154	Takeup trip lever
112	206391-501	Head locking slide
113	206502	Clutch lever
114	206169	Latching gate
115	106404	Latching gate spring
116	106616	Clutch lever compression spring
117	106406	Spring for latch cam return
118	106405	Spring for head locking slide assembly
119		P.H.M. screw No. 6-32 x 1/4"
120		F.H.M. Screw No. 6-32 x 1/4"
121	106128	Pressure wheel spring

CORONADO MODELS
94RA31-43-8115A, B, 94RA31-43-8116A



CORONADO MODELS
94RA31-43-8115A, B, 94RA31-43-8116A

CORONADO MODEL 94RA31-43-8115A

TRADE NAME	Coronado, Models 94RA31-43-8115A, 94RA31-43-8115B, 94RA31-43-8116A
SUPPLIER	Gamble-Skogmo, Inc., 15 N. 8th St., Minneapolis, Minnesota
TYPE SET	AC-DC Operated Superheterodyne Receiver
TUBES (FOUR)	Types 12BE6 Converter, 12SQ7GT or 12AT6 DET-AVC-AF, 50L6GT or 50B5 Power Output, 35Z5GT or 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC RATING .26 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to rear stator of tuning gang. Low side to B-.	455KC (400 ~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001MFD to reduce hum modulation.
2.	.1MFD	"	1620KC (400 ~ Mod.)	"	"	A3	Adjust for maximum output.
3.	75MMF	High side to antenna hank. Low side to B-.	1400KC (400 ~ Mod.)	Tune for maximum signal	"	A4	Adjust for maximum output.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1950 by Howard W. Sams & Co., Inc., Indianapolis Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CORONADO PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2A	DET.-AVC-AF Amp.	12SQ7GT	12SQ7GT	8Q	Model 94RA31-43-8115A
B	DET.-AVC-AF Amp.	12AT6	12AT6	7BT	Models 94RA31-43-8115B and 94RA31-43-8116A
V3A	Power Output	50L6GT	50L6GT	7AC	Model 94RA31-43-8115A
B	Power Output	50B5	50B5	7BZ	Models 94RA31-43-8115B and 94RA31-43-8116A
V4A	Rectifier	35Z5GT	35Z5GT	6AD	Model 94RA31-43-8115A
B	Rectifier	35W4	35W4	5BQ	Models 94RA31-43-8115B and 94RA31-43-8116A

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CORONADO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	40	150	CE-15	PRS150/40-40	EDL4415		TA-440	Filter Green
B	40	150						Filter Red
C2	.05	200	CP503-4	P288-05	GT2S5			AVC Filter
C3	.05	400	CP503-4	P488-05	GT4S5		72P51	Line Isolation
C4	120	500	CM151-1	1468-00015	5W5T15	GP2K-120	1FM-315	Diode RF Filter
C5	.002	400	CP202-2	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling
C6	.005	600	CP502-2	P688-005	GT6D5	GP2M-005	TM-25	Audio Coupling
C7	.02	400	CP203-1	P488-02	GT4S2		TM-12	Output Plate Bypass
C8	.02	400	CP203-1	P488-02	GT4S2		TM-12	Rect. Plate Bypass
C9	500	500	CM501-1	1468-0005	5W5T5	GP2K-500	1FM-35	RF Coupling See Note

Note. Used only in model 94RA31-43-8116A.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	
R1A	2 Meg.	½	VC-11	Q13-139	M-66-Z	Volume control see note
B	Switch		Not Req.	76-1	SW-A	Attach to R1A per instructions

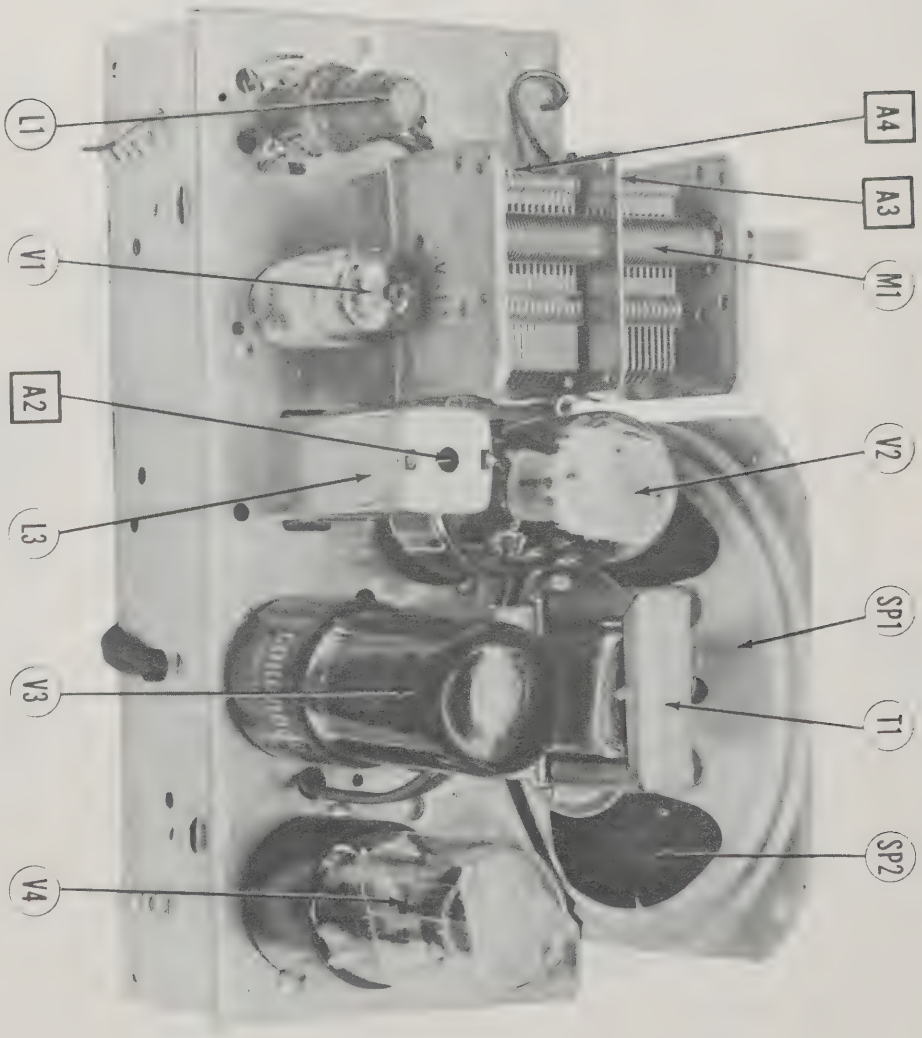
NOTE: Install a 100KΩ resistor in series with the right hand terminal of the new control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CORONADO PART No.	IRC PART No.	
R2	18KΩ	½	RC-183-2	BTS-18K	Osc. Grid
R3	4.7 Meg.	½	RC-475-1	BTS-4.7 Meg.	AVC Network
R4	10 Meg.	½	RC-106-1	BTS-10 Meg.	AF Grid
R5	220KΩ	½	RC-224-1	BTS-220K	AF Plate
R6	330KΩ	½	RC-334-1	BTS-330K	Output Grid
R7	2200Ω	1	RC-222-5	BW-1-2200	Filter
R8	39Ω	1	RC-390-5	BW-1-39	Filament Dropping (WireWound)
R9	18Ω	½	RC-180-1		Rect. Ballast
R10	18KΩ	½	RC-183-2	BTS-18K	Conv. Grid See Note
R11	220KΩ	½	RC-224-1	BTS-220K	AVC Network

Note. Used in model 94RA31-43-8116A only.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CORONADO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	2500Ω	3.3Ω	275Ω	.7Ω	Part of SP-47-10A	A-3332 ‡	A-3025 ‡	RO-1A ‡	‡ Bend mounting tabs down and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CORONADO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-113 †		
SP1	PM	3.3Ω	SP-47-10A	MOD. P4-X	4A07 †	† Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

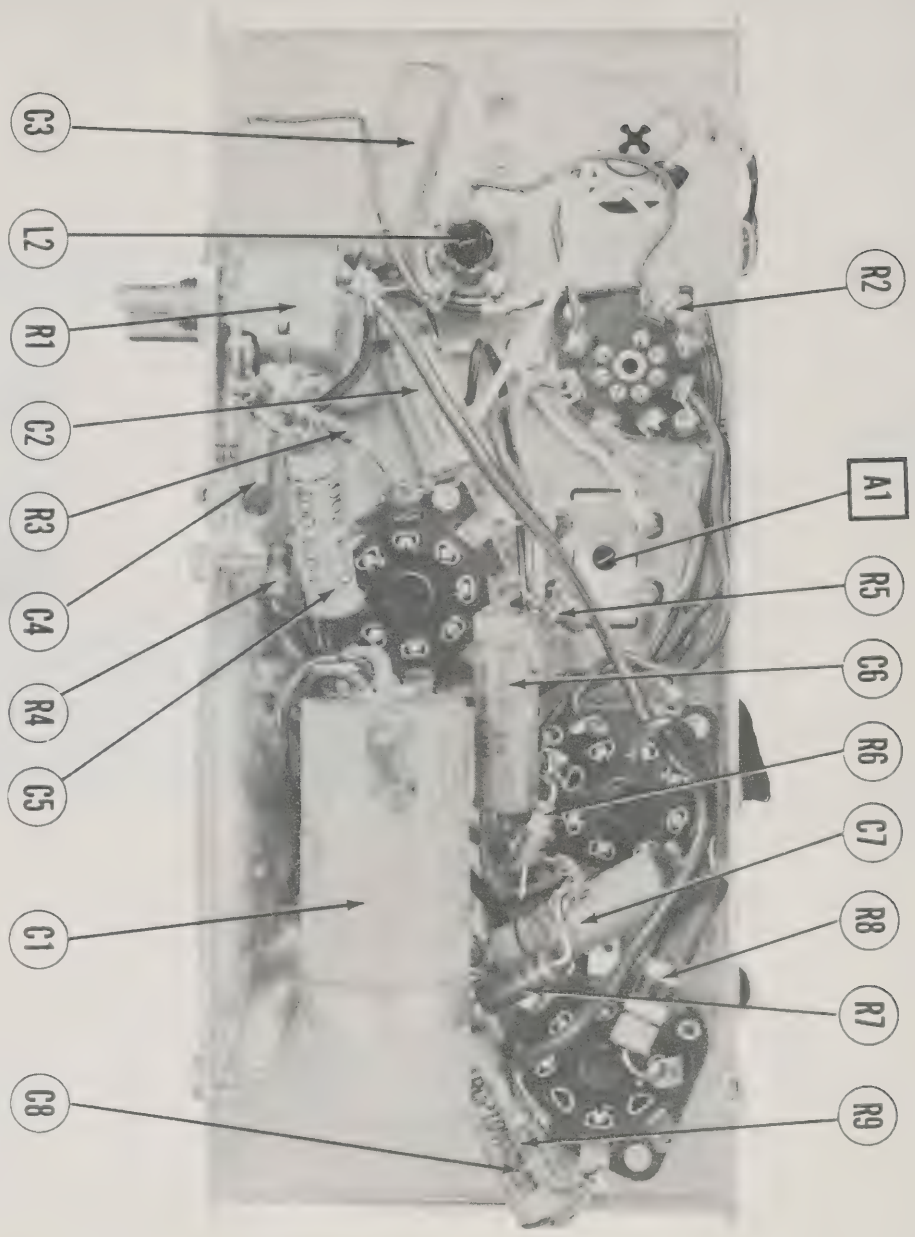
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	
L1A	Ant. Coil	42Ω	2.2Ω	LA-5		Used in models 94RA31-43-8115A and B Used in model 94RA31-43-8116A * Add 50MMF from Osc. Grid to high side of tuning cap.
B	Ant. Coil	85Ω	2.5Ω	LA-8		
L2	Osc. Coil	.5Ω	6Ω	LC-6	14-1060 *	
L3	IF Transformer	18.5Ω	18.5Ω	LF-24	16-6678	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M2	2 Gang Var. Cap.	CV14	(27-446MMF, 24-185MMF)
	Cabinet	CB-100A	
	Knob	KN-20-2	
	Pointer Knob	KN-21-2	

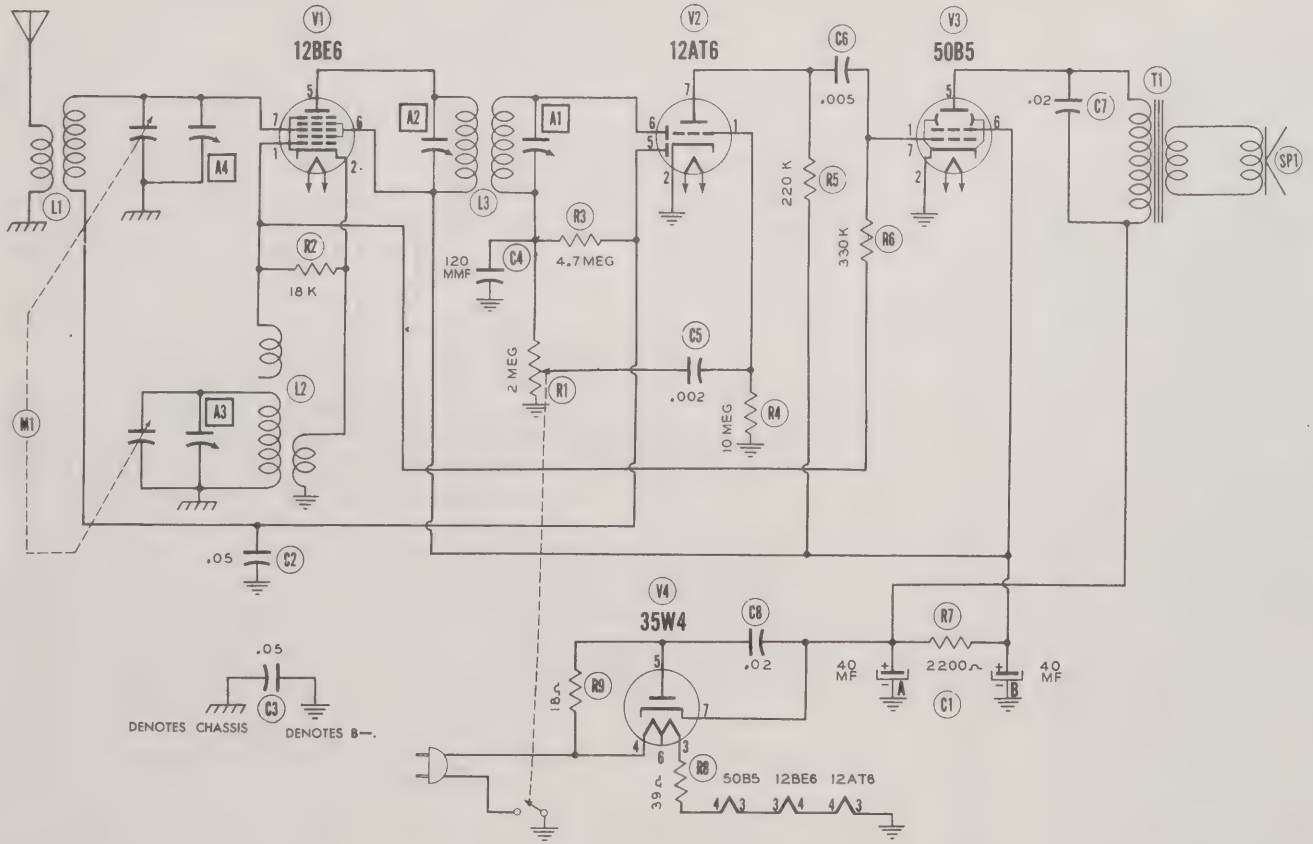
CHASSIS—BOTTOM VIEW

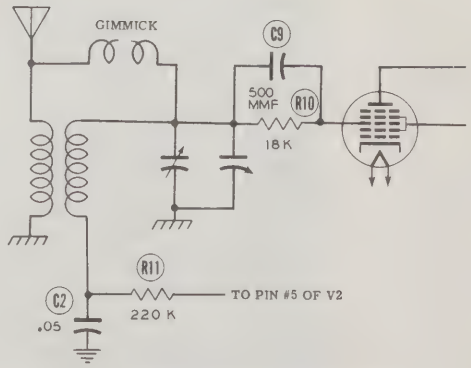


SET 81 FOLDER 5

CORONADO
MODEL 94RA31-43-8115A

CORONADO
MODEL 94RA31-43-8115A





MODEL 94RA31-43-8116A INPUT CIRCUIT

IF = 455 KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BE6	§-7VDC	0V.	27VAC	13VAC	72VDC	72VDC	-.6VDC	
V 2	12SQ7GT	0V.	-.6VDC	0V.	-.6VDC	-.6VDC	57VDC	0V.	13VAC
V 3	50L6GT	0V.	80VAC	95VDC	72VDC	-.8VDC	-.6VDC	27VAC	0V.
V 4	35Z5GT	0V.	90VAC	89VAC	0V.	115VAC	0V.	117VAC	115VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BE6	18KΩ	1Ω	24Ω	12Ω	†2.2KΩ	†2.2KΩ	6.7Meg.	
V 2	12SQ7GT	INF	10 Meg.	0Ω	6.7 Meg.	2 Meg.	†220KΩ	0Ω	12Ω
V 3	50L6GT	INF	74Ω	†270Ω	†2.2KΩ	340KΩ	18KΩ	24Ω	0Ω
V 4	35Z5GT	INF	120Ω	110Ω	INF	125Ω	INF	135Ω	50KΩ

† Measured from pin 8 of V4.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

CROSLEY
MODEL 9-422M, 9-422MA

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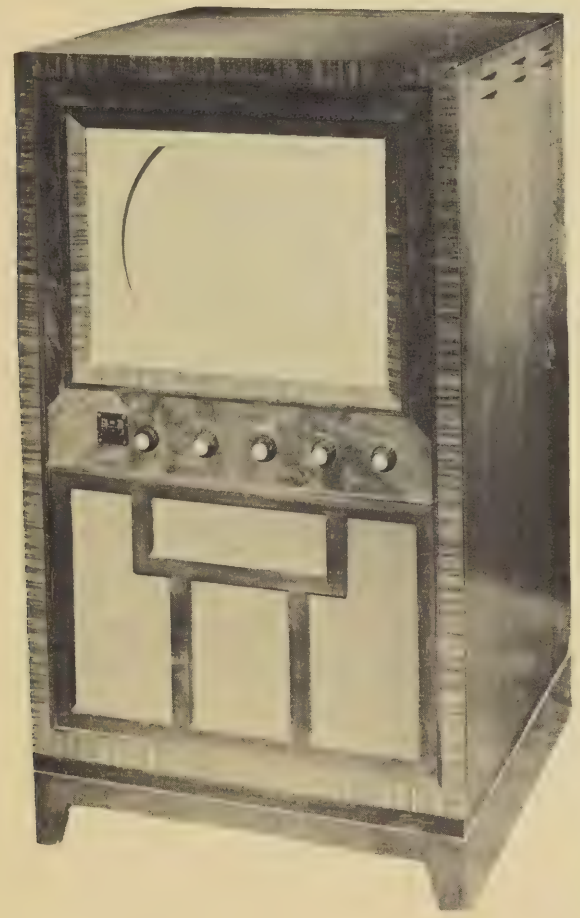

MODEL 9-422M

CROSLEY
MODEL 9-422M, 9-422MA

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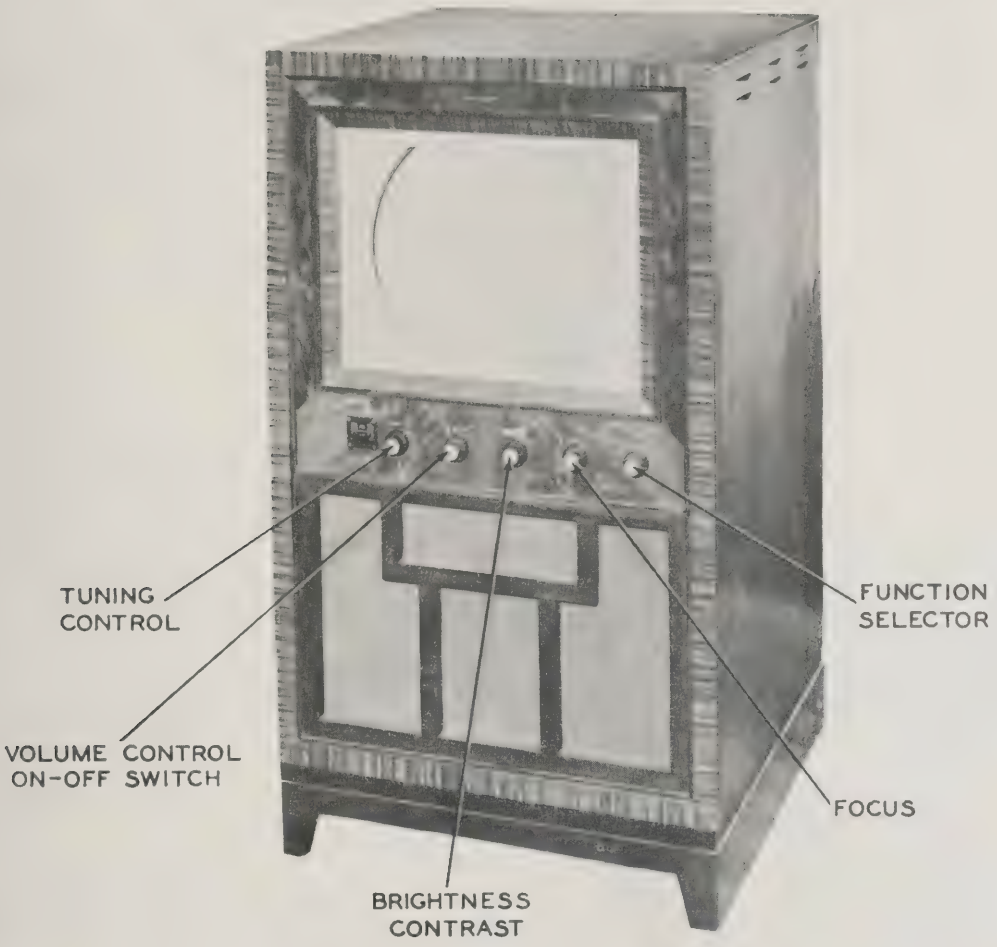
MODELS 9-422M, 9-422MA



CROSLEY
MODELS 9-422M, 9-422MA

CROSLEY MODEL 9-422M

TRADE NAME	Crosley, Models 9-422M, 9-422MA
MANUFACTURER	Crosley Div., Aveo Manufacturing Corp., Cincinnati 25, Ohio
TYPE SET	TV-FM Receiver
TUBES	Twenty Nine
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	2.6 Amp. at 117 Volts AC (TV) .660 Amp. at 117 Volts AC (FM)
TUNING RANGE–	44 thru 217MC(Continuous Tuning)

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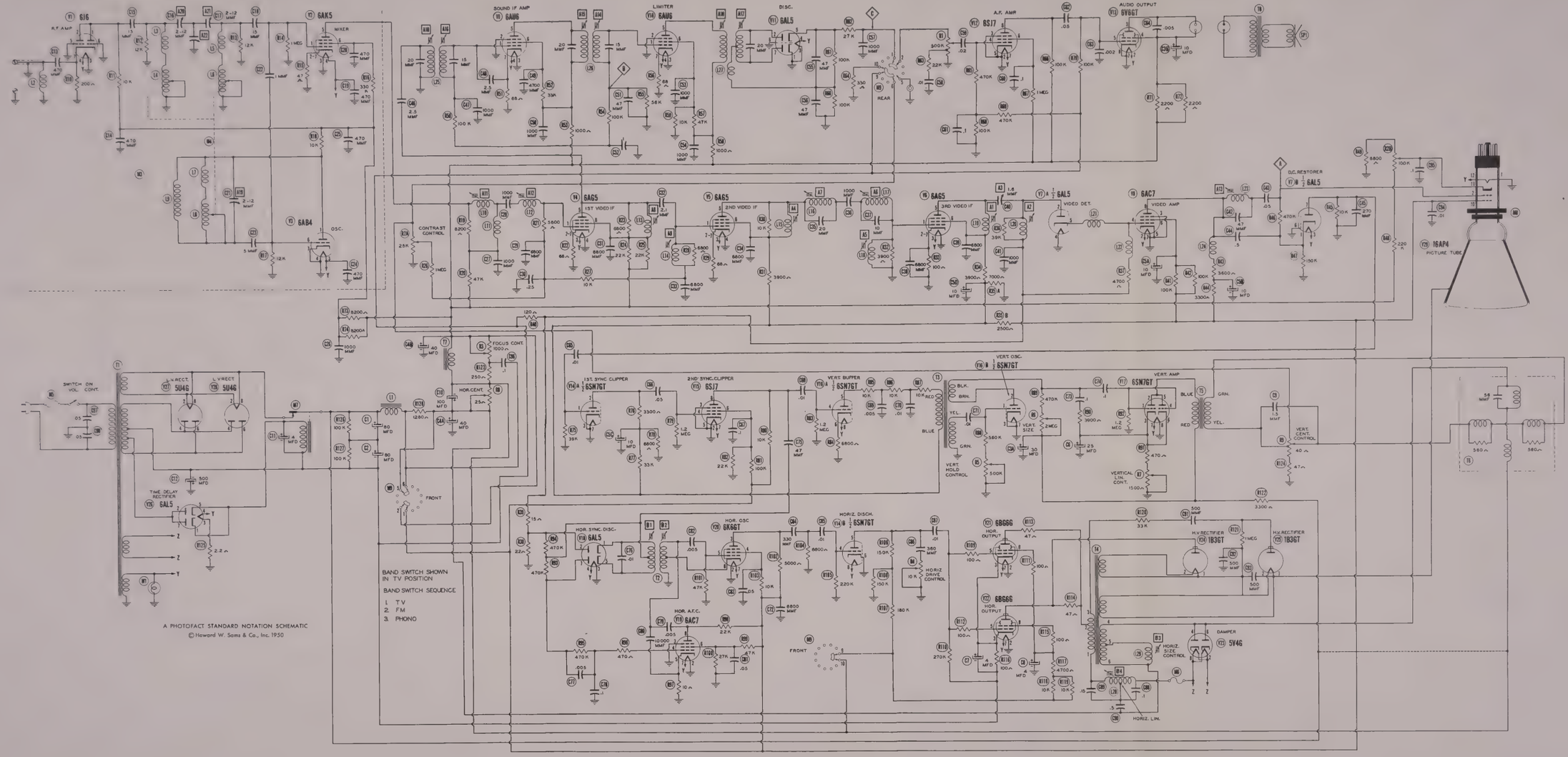
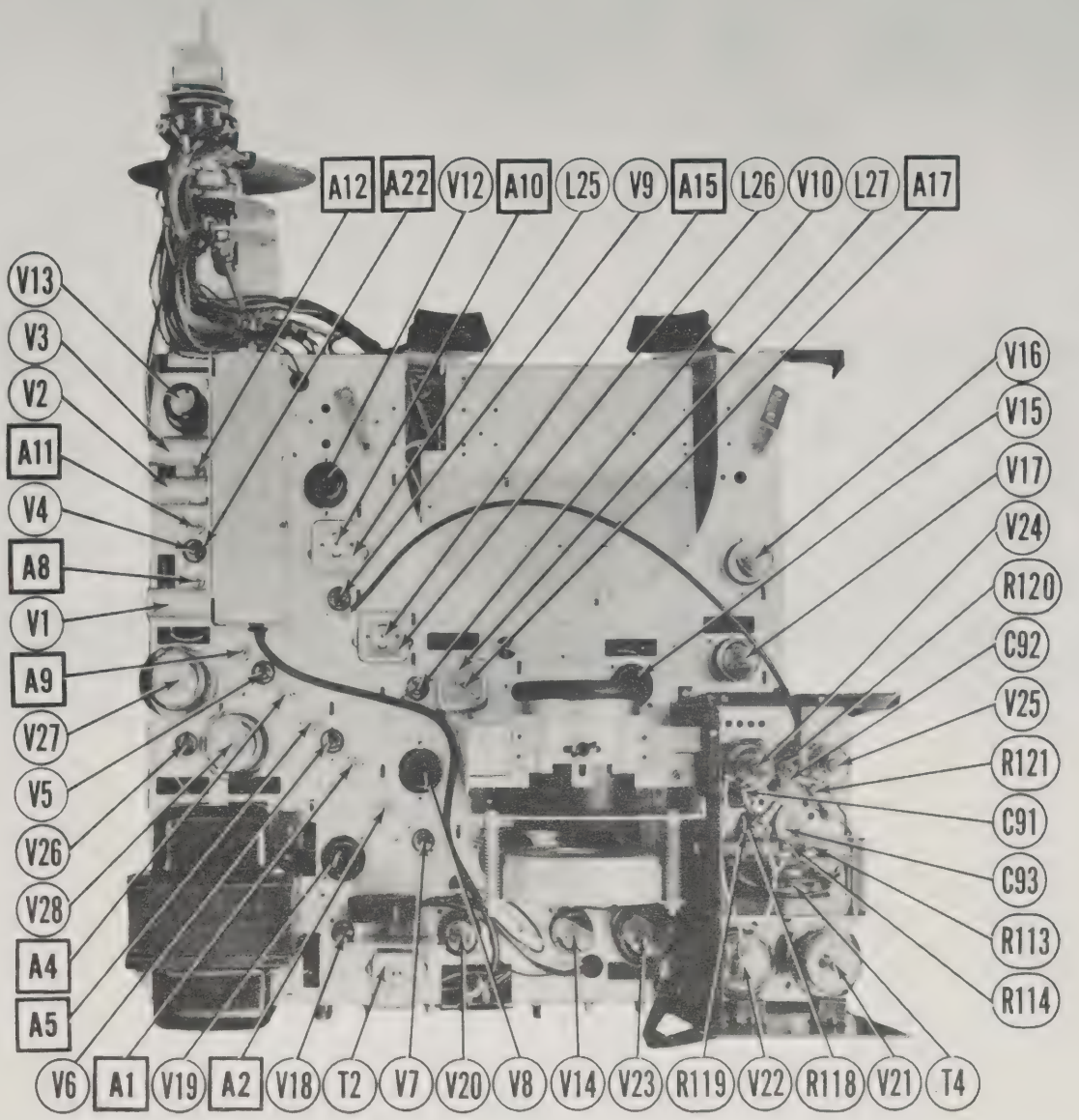
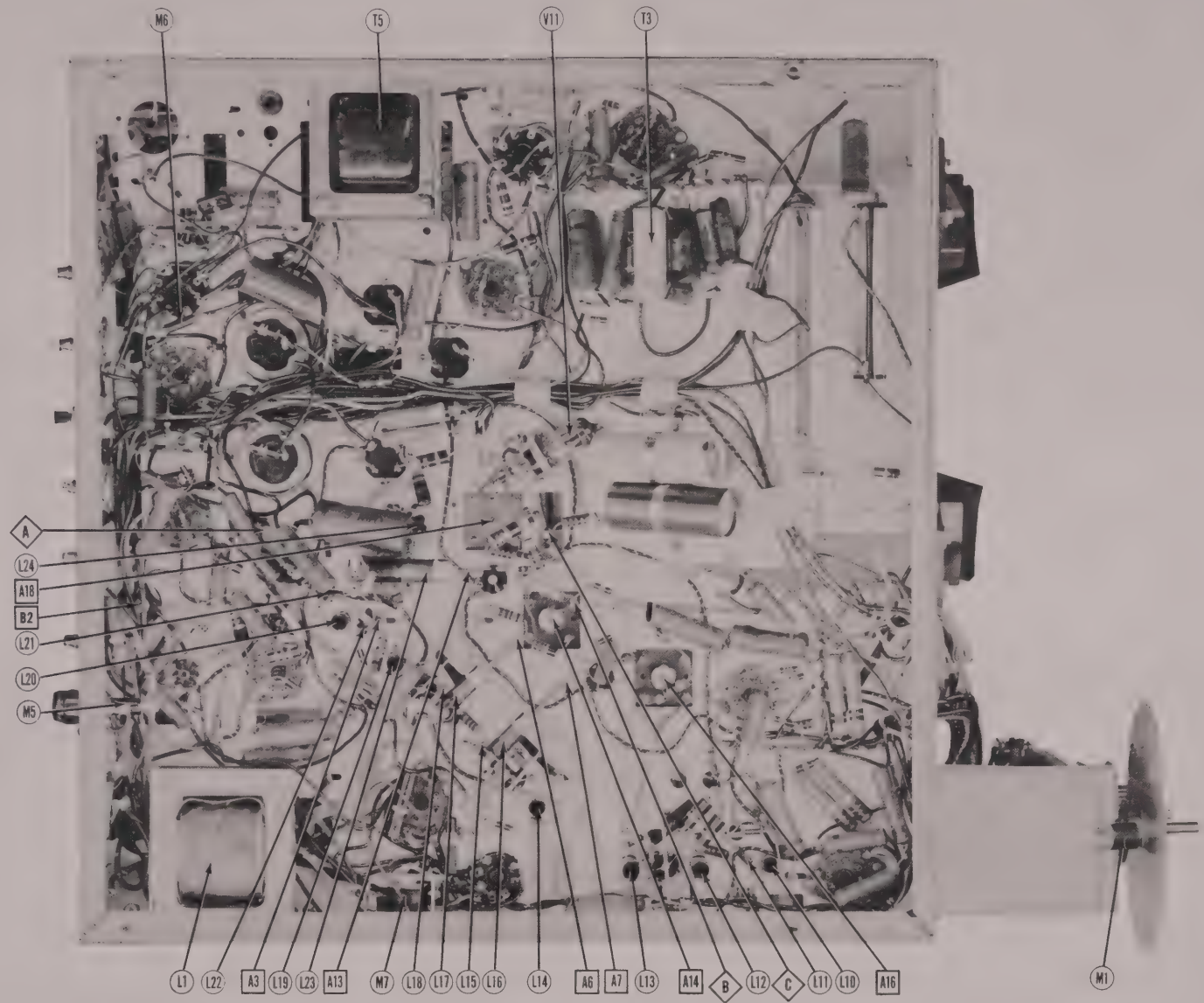


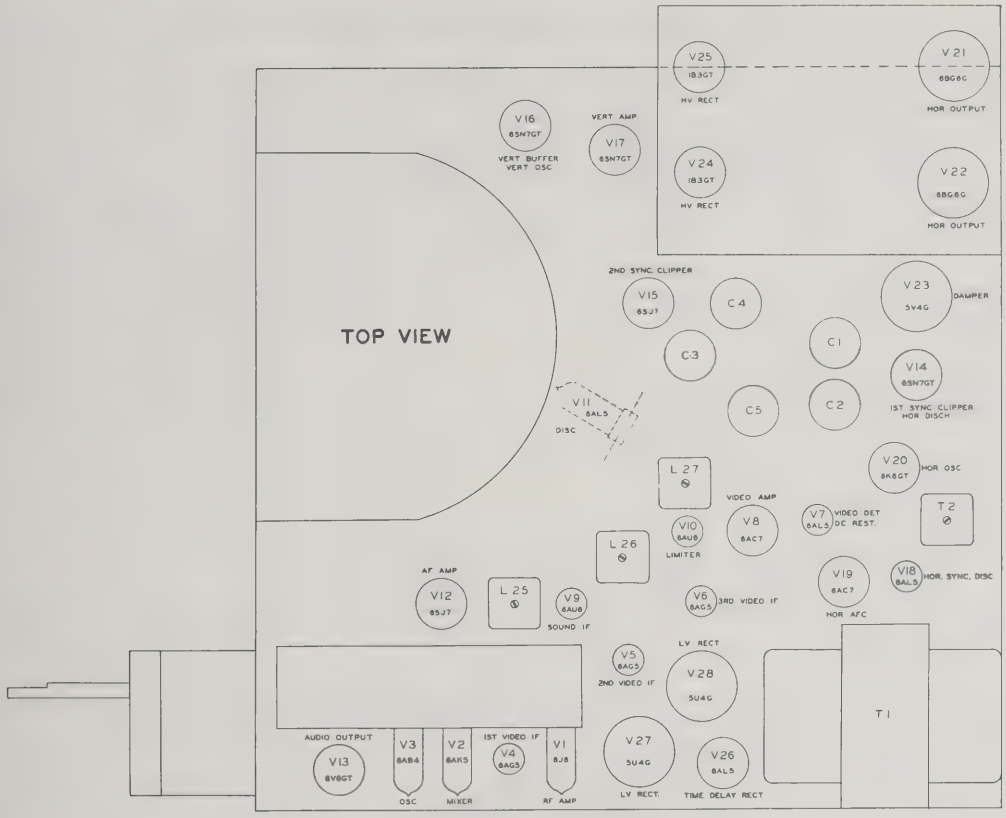
CROSLEY
MODELS 9-422M, 9-422MA

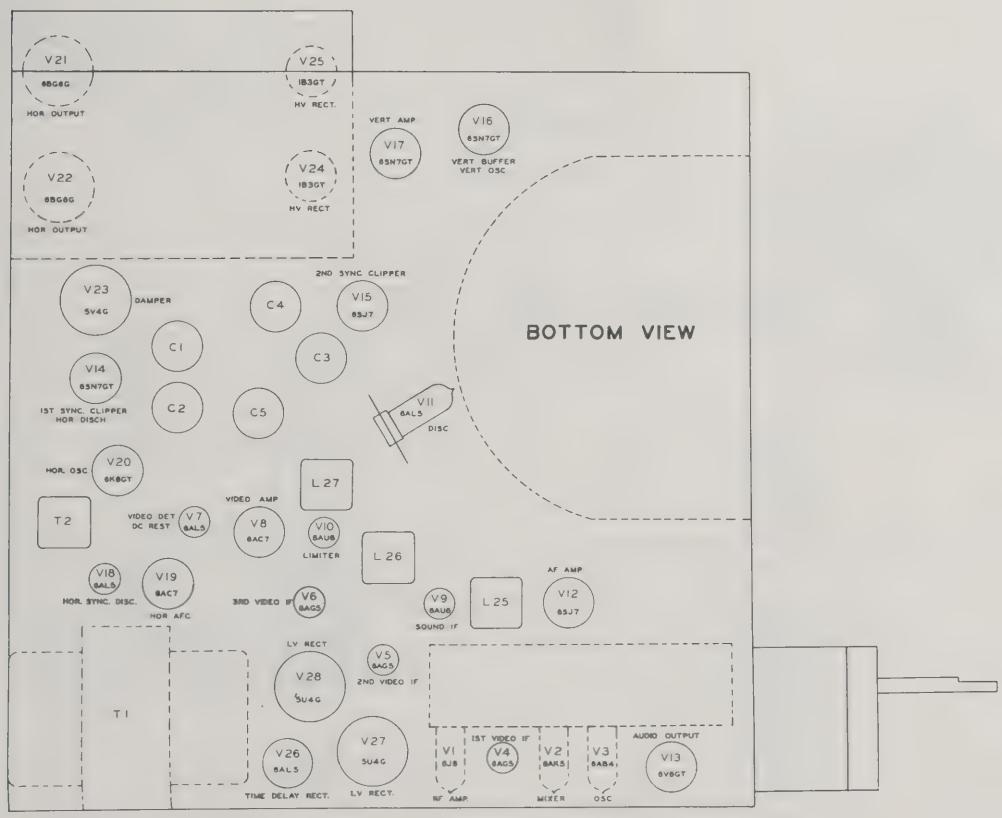


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Remove the picture tube during alignment.
During alignment remove the horizontal oscillator tube (V20) to eliminate high voltage shock hazard.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Remove the local oscillator tube (V3) to prevent erroneous indications.
To prevent overloading, keep the contrast control as low as possible and yet retain a usable indication on the scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	1000MMF	High side to pin 1 (Grid) of 6AG5 (V6). Low side to chassis.	24MC (10MC Sweep)	22.9MC 26.4MC	Any	Vert. Amp. to Point (A) Low side to chassis.	A1, A2, A3	Adjust for response similar to Fig 1 with markers as shown. A3 is a "gimmick" which is adjusted by varying the spacing between the wires.
2.	1000MMF	High side to pin 1 (Grid) of 6AG5 (V5). Low side to chassis.	"	22.9MC 26.4MC 27.9MC	"	"	A4, A5, A6, A7	Adjust for response similar to Fig 2 with markers as shown. Adjust trap A6 for minimum response at 27.9MC point on curve. Adjust trap A7 for minimum response at 21.9MC point on curve.
3.	1000MMF	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	"	21.9MC 22.9MC 26.4MC	"	"	A8, A9, A10	Adjust for response similar to Fig 3 with markers as shown. Adjust trap A9 for minimum response at 21.9MC point on curve.
4.	1000MMF	High side to pin 6 of oscillator tube (V3) socket. Low side to chassis.	"	22.9MC 25.65MC 26.4MC	"	"	A11, A12	Adjust for response similar to Fig 4. with markers as shown. If necessary retouch A1 thru A11 for proper response.

4.5 MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 4 (Grid) of 6AC7 (V8). Low side to chassis.	Not used	4.5MC (400 ~ Mod).	Any	Vert. Amp. to Point (A) Low side to chassis.	A13	Adjust for minimum 400 ~ response on scope. If a broadband scope is not available, a VTVM with suitable RF probe may be used.

SOUND IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	1000MMF	High side to pin 1 (Grid) of 6AU6 (V9). Low side to chassis.	21.9MC (1MC Sweep)	21.9MC	Any	Vert. Amp. to Point (B) Low side to chassis.	A14, A15	Adjust for maximum amplitude and symmetry as per Fig 5.
7.	1000MMF	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	"	"	"	"	A16	Adjust for maximum amplitude and symmetry as per Fig 5. If necessary, retouch A14 and A15.
8.	1000MMF	"	"	"	"	Vert. Amp. to Point (C) Low side to chassis.	A17, A18	Adjust A17 so 21.9MC occurs at center of diagonal line as per Fig 6. Adjust A18 for maximum amplitude and straightness of diagonal line. If necessary alter the dress of the two green leads from the detector transformer to pins 2 and 7 of V11 to obtain symmetrical "S" curve.

OSCILLATOR ALIGNMENT

A. Unsolder the blue lead only from L10.
B. Remove the RF unit mounting screws.
C. Remove the bottom shield from the tuner and replace with the dummy shield shown in Fig. 7.
D. Remount the RF tuner on the chassis.
E. Reconnect the blue lead which was disconnected in step "A".
F. Check the dial setting on the shaft. The dial is properly set when the small transparent mark on the edge of both dials coincide at the bottom of the dial, with the shaft turned fully clockwise.
G. Replace the local oscillator tube V3.
H. The sound IF system must be properly aligned before attempting oscillator alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9.	Direct	Across antenna terminals. (High side to ungrounded terminal).	71.75MC (Unmod.)	4	DC Probe to Point (C) Common to chassis.	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
10.	Direct	"	81.75MC (Unmod.)	5	"		Check all low band channels to see that zero reading occurs at the proper dial setting as the sound carrier frequency for each channel is fed into the receiver.
			87.75MC (Unmod.)	6			
			65.75MC (Unmod.)	3			
			59.75MC (Unmod.)	2			
11.	Direct	"	215.75MC	13	"	L7	Expand or compress coil turns for zero reading. as obtained in step 9. Use extreme care when adjusting this coil to avoid bending it to much.
12.	Direct	"	209.75MC (Unmod.)	12	"		Check all high band channels to see that zero reading occurs at the proper dial setting as the sound carrier frequency for each channel is fed into the receiver.
			203.75MC (Unmod.)	11			
			197.75MC (Unmod.)	10			
			191.75MC (Unmod.)	9			
			185.75MC (Unmod.)	8			
			179.75MC (Unmod.)	7			

ALIGNMENT INSTRUCTIONS (CONT.)

RF & MIXER ALIGNMENT

The RF and mixer lines in this receiver are pre-set at the factory and are normally very stable. Alignment should not be attempted unless they are definitely known to be out of alignment.

A. Leave the dummy shield on the tuner as used during oscillator alignment.

B. Solder a 5 inch lead to the screen grid, (pin 6), of the 6AK5 mixer tube (V2). Run this lead through the plate lead hole to the underside of the chassis.

C. Set the tuning dial for zero reading on VTVM, connected to discriminator output, as 71.75MC is fed into the receiver. (Follow step 9 of oscillator alignment for this setting.) Do not change this dial setting during low band alignment outlined in step 13.

D. After this setting has been obtained, unsolder the blue lead from L10 and connect it together with the 5 inch screen lead on the mixer tube. The junction of these two leads is the point of connection for the oscilloscope vertical input.

E. After step 13 has been completed, reconnect the blue lead to L10 and adjust the tuning dial for zero discriminator output with 215.75MC being fed into the receiver (Follow step 11 of oscillator alignment for this setting.)

F. Repeat step D above, for high band alignment.

G. The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	See note "g" above.	High side to ungrounded antenna terminal. Low side to chassis.	69MC (10MC Sweep)	67.25MC 71.75MC	4 (See step "C" of RF alignment instructions)	See note "D" above.	A20, A21, A22	Adjust for response curve similar to Fig. 8 with markers as shown. The setting of A17 and A18 is correct when the rocking of A21 causes no noticeable change in amplitude at the 67.25MC point. The dip between peaks should not exceed 30%.
14.	"	"	213MC (10MC Sweep)	211.25MC 215.75MC	13 (See step "E" on RF alignment instructions.	See step "D" above.	L3, L5 C15, C18	Adjustment of high band is accomplished by positioning of L3, L5, C15 and C18 for response curve similar to Fig 9 with markers as shown. The bandwidth should not exceed 6MC or be less than 4.5MC. If adjustment of channel 13 is made, it will be necessary to repeat step 13. Repeat steps 13 and 14 until no further improvement can be made.

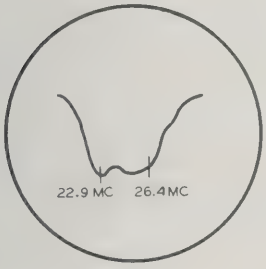


FIG. 1

FIG. 2

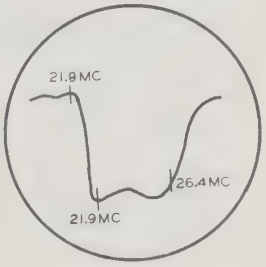


FIG. 3

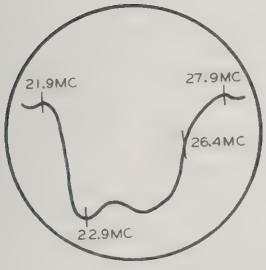


FIG. 4

FIG. 5

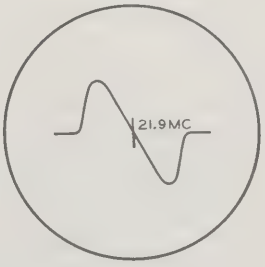


FIG. 6

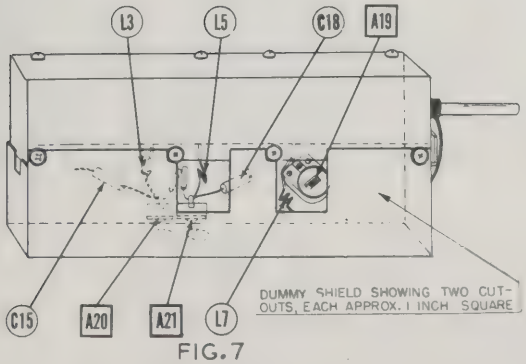


FIG. 7

FIG. 8

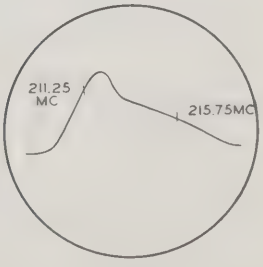


FIG. 9

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J6	130VDC	130VDC	0V	6.3VAC	0V	0V	2.1VDC		
V 2	6AK5	-.8VDC	.1VDC	0V	6.3VAC	225VDC	55VDC	.1VDC		
V 3	6AB4	160VDC	0V	6.3VAC	0V	0V	§-3.5VDC	0V		
V 4	6AG5	0V	.8VDC	6.3VAC	0V	175VDC	175VDC	.8VDC		
V 5	6AG5	0V	.8VDC	6.3VAC	0V	125VDC	125VDC	.8VDC		
V 6	6AG5	0V	1.1VDC	6.3VAC	0V	130VDC	130VDC	1.1VDC		
V 7	6AL5	.3VDC	-2.8VDC	6.3VAC	0V	-2.6VDC	0V	0V		
V 8	6AC7	0V	6.3VAC	0V	-2.6VDC	0V	185VDC	0V	240VDC	
V 9	6AU6	-.1VDC	0V	0V	6.3VAC	280VDC	165VDC	.8VDC		
V 10	6AU6	-.2VDC	0V	0V	6.3VAC	285VDC	45VDC	.2VDC		
V 11	6AL5	0V	-.3VDC	0V	6.3VAC	1.2VDC	0V	-.3VDC		
V 12	6SJ7	0V	0V	0V	-.6VDC	0V	45VDC	6.3VAC	205VDC	
V 13	6V6GT	0V	6.3VAC	240VDC	250VDC	-8.3VDC	-12VDC	0V	0V	
V 14	6SN7GT	-.3VDC	17VDC	0V	-37VDC	30VDC	0V	0V	6.3VAC	
V 15	6SJ7	0V	0V	0V	-.5VDC	0V	50VDC	6.3VAC	270VDC	
V 16	6SN7GT	-38VDC -50VDC	115VDC 235VDC	0V	0V	145VDC	6.6VDC	0V	6.3VAC	
V 17	6SN7GT	.1VDC	310VDC	7VDC 12VDC	0V	310VDC	7VDC 12VDC	6.3VAC	0V	
V 18	6AL5	2.2VDC	-1.6VDC	0V	6.3VAC	.5VDC	0V	-.8VDC		
V 19	6AC7	0V	0V	0V	-1.1VDC	0V	95VDC	6.3VAC	255VDC	
V 20	6K6GT	0V	0V	215VDC	225VDC	-35VDC	290VDC	6.3VAC	.6VDC	
V 21	6BG6G	0V	0V	.6VDC	0V	-20VDC	0V	6.3VAC	235VDC	TOP CAP *
V 22	6BG6G	0V	0V	.6VDC	0V	-20VDC	0V	6.3VAC	235VDC	TOP CAP *
V 23	5V4G	95VDC	425VDC	290VDC	330VDC	330VDC	330VDC	425VDC	425VDC	
V 24	1B3GT	*	DO NOT	MEASURE						
V 25	1B3GT	*	DO NOT	MEASURE						
V 26	6AL5	40VDC	-12VDC	.6VAC	6.3VAC	40VDC	0V	-12VDC		
V 27	5U4G	0V	360VDC	0V	355VAC	0V	355VAC	0V	360VDC	
V 28	5U4G	-2.8VDC	360VDC	0V	355VAC	-12VDC	355VAC	330VDC	360VDC	
V 29	16AP4	0V	.1VDC	PIN 10 290VDC	PIN 11 95VDC	PIN 12 6.3VAC				

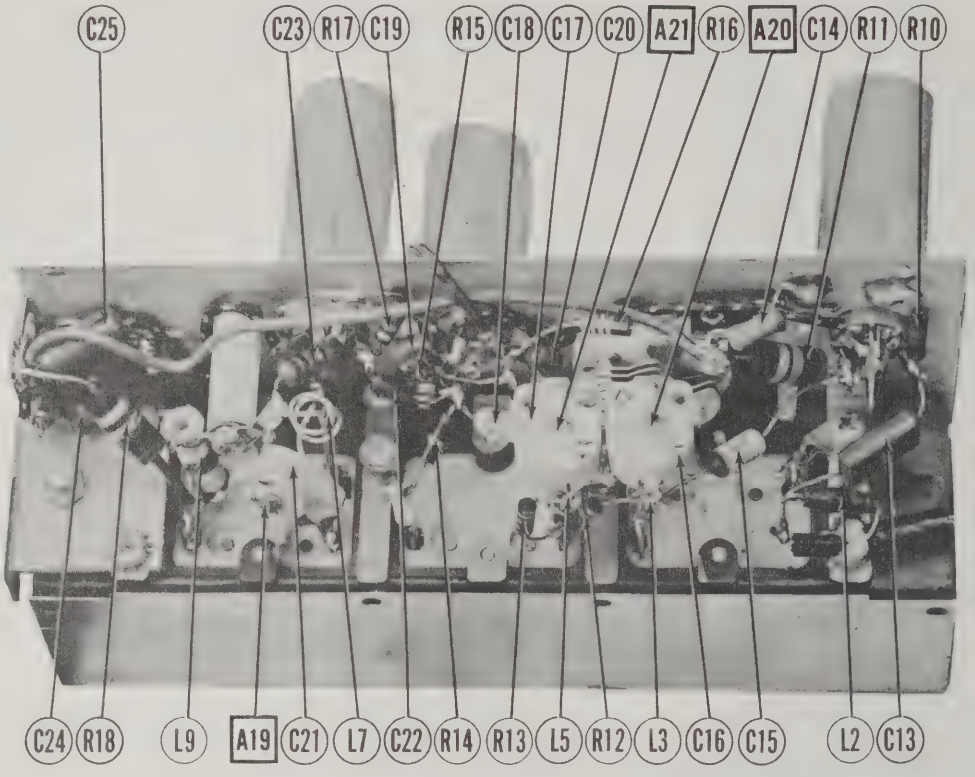
§ Taken with vacuum tube voltmeter.
* Do not measure.
Note. Contrast control set at maximum for these readings.

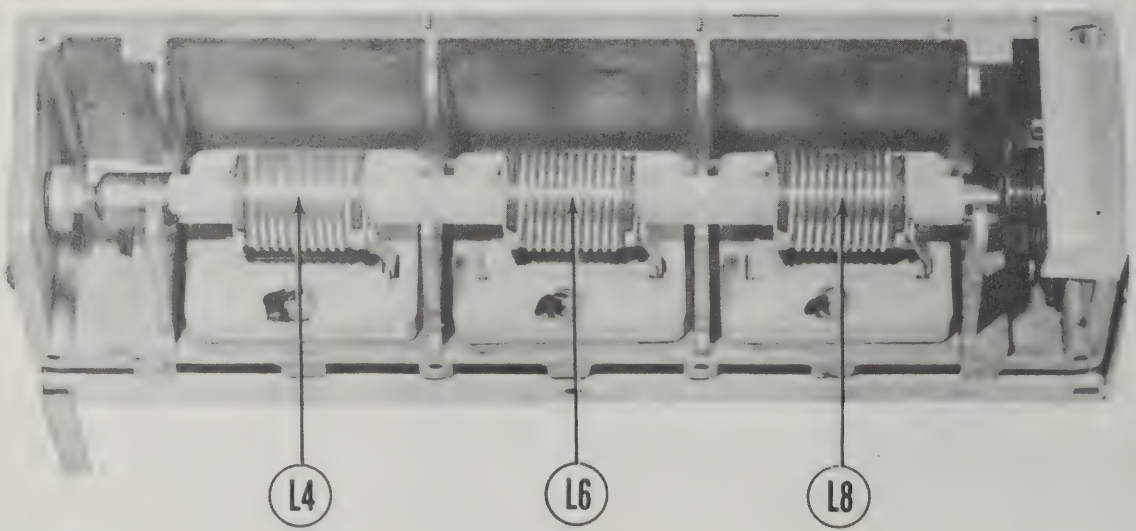
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J6	†16KΩ	†16KΩ	0Ω	.1Ω	0Ω	0Ω	200Ω		
V 2	6AK5	1 Meg.	47Ω	0Ω	.1Ω	†48KΩ	+†330KΩ	47Ω		
V 3	6AB4	†15KΩ	0Ω	.1Ω	0Ω	0Ω	12KΩ	0Ω		
V 4	6AG5	1 Meg.	68Ω	.1Ω	0Ω	†12KΩ	†12KΩ	68Ω		
V 5	6AG5	1 Meg.	68Ω	.1Ω	0Ω	†7KΩ	†7KΩ	68Ω		
V 6	6AG5	.7Ω	100Ω	.1Ω	0Ω	†7KΩ	†7KΩ	100Ω		
V 7	6AL5	150KΩ	30Ω	.1Ω	0Ω	4.7KΩ	0Ω	10KΩ		
V 8	6AC7	0Ω	.1Ω	0Ω	4.7KΩ	0Ω	†50KΩ	0Ω	†8KΩ	
V 9	6AU6	250KΩ	0Ω	0Ω	.1Ω	†1.5KΩ	†34KΩ	68Ω		
V 10	6AU6	56KΩ	0Ω	0Ω	.1Ω	†1.5KΩ	†17KΩ	68Ω		
V 11	6AL5	0Ω	100KΩ	0Ω	.1Ω	200KΩ	0Ω	100KΩ		
V 12	6SJ7	0Ω	0Ω	0Ω	570KΩ	0Ω	†1 Meg.	.1Ω	†100KΩ	
V 13	6V6GT	0Ω	.1Ω	†2KΩ	†1.5KΩ	100KΩ	55Ω	0Ω	0Ω	
V 14	6SN7GT	40KΩ	†20KΩ	0Ω	220KΩ	†250KΩ	0Ω	0Ω	.1Ω	
V 15	6SJ7	0Ω	0Ω	0Ω	1.2 Meg.	0Ω	†28KΩ	.1Ω	†12KΩ	
V 16	6SN7GT	1 Meg. 600KΩ	†2.5Meg. †470KΩ	0Ω	1.2 Meg.	†32KΩ	6.8KΩ	0Ω	.1Ω	
V 17	6SN7GT	1.2 Meg.	†4KΩ	2KΩ 470Ω	1.2 Meg.	†4KΩ	2KΩ 470Ω	.1Ω	0Ω	
V 18	6AL5	470KΩ	22Ω	0Ω	.1Ω	470KΩ	Inf.	1 Meg.		
V 19	6AC7	0Ω	0Ω	0Ω	1.5 Meg.	10Ω	†25KΩ	.1Ω	†22KΩ	
V 20	6K6GT	0Ω	0Ω	†5.5KΩ	†10KΩ	47KΩ	†600Ω	.1Ω	30Ω	
V 21	6BG6G	Inf.	0Ω	150Ω	Inf.	270KΩ	Inf.	.1Ω	†10KΩ	TOP CAP #100Ω
V 22	6BG6G	Inf.	0Ω	150Ω	Inf.	270KΩ	Inf.	.1Ω	†10KΩ	TOP CAP #100Ω
V 23	5V4G	†80KΩ	Inf.	†360Ω	†85Ω	†80Ω	†85Ω	Inf.	Inf.	
V 24	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP #900Ω
V 25	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP Inf.
V 26	6AL5	5KΩ	58Ω	Ω	.1Ω	5KΩ	Inf.	58Ω		
V 27	5U4G	Inf.	12KΩ	Inf.	66 Ω	Inf.	65Ω	Inf.	12KΩ	
V 28	5U4G	35Ω	12KΩ	Inf.	68Ω	55Ω	67Ω	12KΩ	12KΩ	
V 29	16AP4	0Ω	620KΩ	PIN 10 †400Ω	PIN 11 80KΩ	PIN 12 .1Ω				

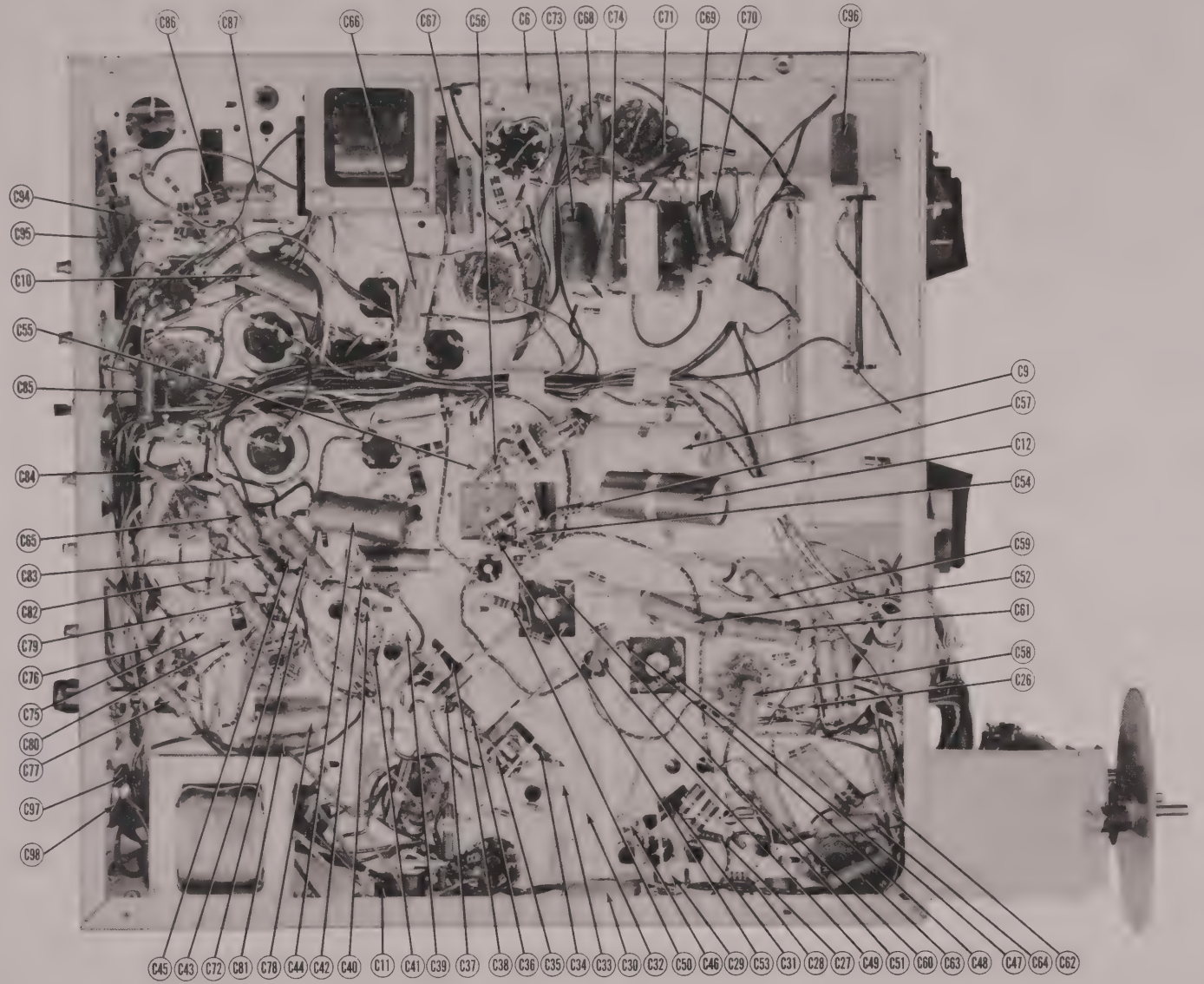
† Measured from pin 8 of V28.
# Measured from pin 8 of V23.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

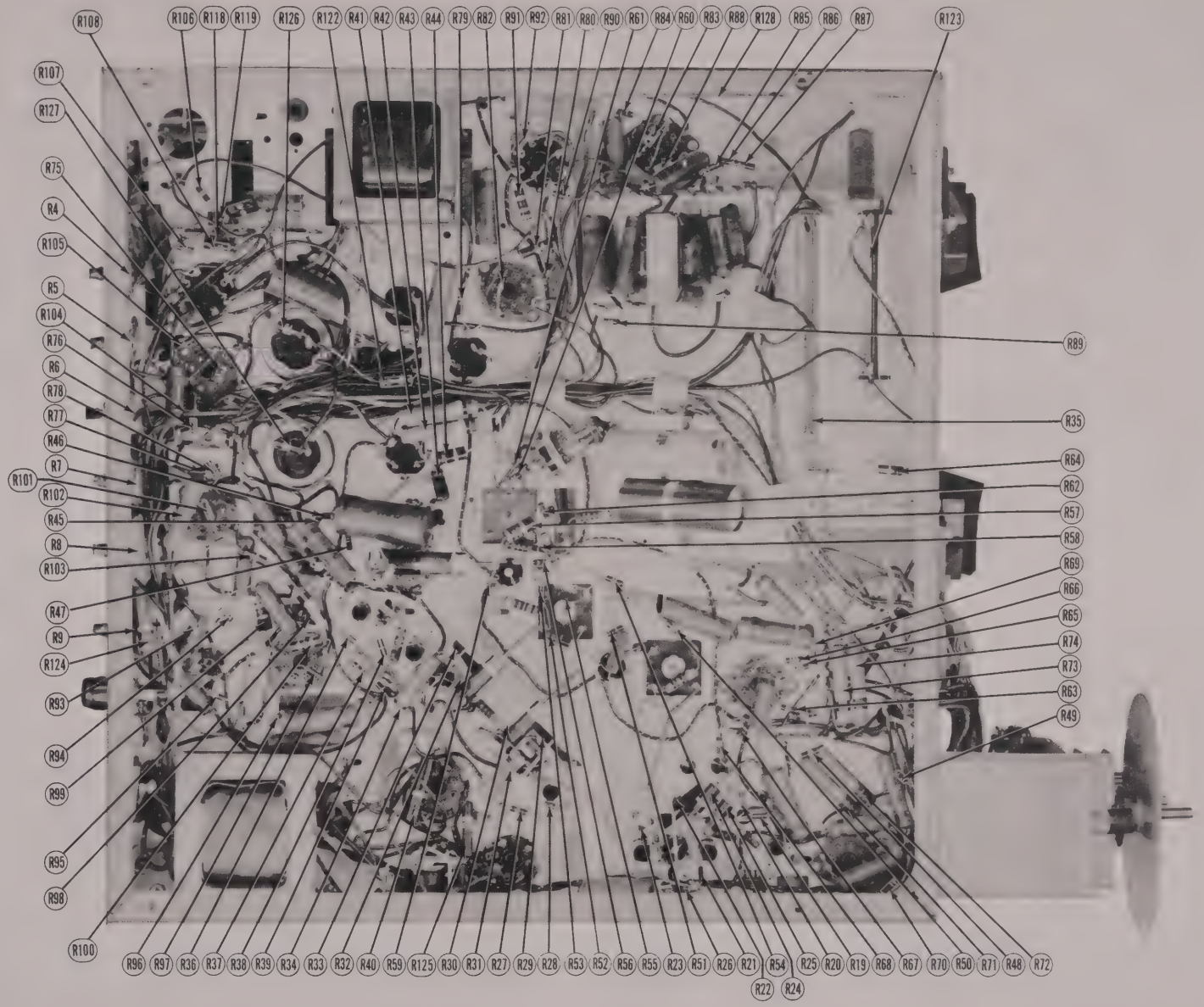

C25
C23
R17
C19
R15
C18
C17
C20
A21
R16
A20
C14
R11
R10
C24
R18
L9
A19
C21
L7
C22
R14
R13
L5
R12
L3
C16
C15
L2
C13


L4
L6
L8

INDUCTUNER



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6J6	6J6	7BF	
V2	Mixer	6AK5	6AK5	7BD	
V3A	Oscillator	6AB4	6AB4	5CE	
B	Oscillator	6J6	6J6	7BF	
V4	1st Video IF Amp.	6AG5	6AG5	7BD	
V5	2nd Video IF Amp.	6AG5	6AG5	7BD	
V6	3rd Video IF Amp.	6AG5	6AG5	7BD	
V7	Video Det.-DC Restorer	6AL5	6AL5	6BT	
V8	Video Amp.	6AC7	6AC7	8N	
V9	1st Sound IF Amp.	6AU6	6AU6	7BK	
V10	Limiter	6AU6	6AU6	7BK	
V11	Disc.	6AL5	6AL5	6BT	
V12	AF Amp.	6SJ7	6SJ7	8N	
V13	Audio Output	6V6GT	6V6GT	7AC	
V14	1st Sync. Clipper-Hor. Disch.	6SN7GT	6SN7GT	8BD	
V15	2nd Sync. Clipper	6SJ7	6SJ7	8N	
V16	Vert. Buffer-Vert. Osc.	6SN7GT	6SN7GT	8BD	
V17	Vert. Amp.	6SN7GT	6SN7GT	8BD	
V18	Hor. Sync. Disc.	6AL5	6AL5	6BT	
V19	Hor. AFC	6AC7	6AC7	8N	
V20	Hor. Osc.	6K6GT	6K6GT	7S	
V21	Hor. Output	6BG6G	6BG6G	5BT	
V22	Hor. Output	6BG6G	6BG6G	5BT	
V23	Damper	5V4G	5V4G	5L	
V24	HV Rectifier	1B3GT	1B3GT	3C	
V25	HV Rectifier	1B3GT	1B3GT	3C	
V26	Time Delay Rect.	6AL5	6AL5	6BT	
V27	LV Rectifier	5U4G	5U4G	5T	
V28	LV Rectifier	5U4G	5U4G	5T	
V29	Picture Tube	16AP4	16AP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	80	350	W-160039	AFN16H	UP8AJ242		TVL-5	Filter
C2	80	350	W-160039	AFN16H	UP8AJ242		TVL-5	Filter
C3A	30	450	W-160074	AF66J	UP7BJ913		TVL-15	● Filter
B	10	450						▲ Output Decoupling
C4A	40	475	B-160549	AF8X8I	UP9BJ995		TVL-20	● Filter
B	40	400						▲ Filter
C5A	10	350	W-160076	AF2222J	UP111145		EL-410	● V. Amp. Screen Bypass
B	10	350						■ Low Pass Filter
C	10	300						▲ 1st Sync. Clipper Decoupling
D	10	300						Decoupling
C6	25	50	W-160075	PRS50/25	BR255A		TVA-15	Vert. Output Cath. Bypass
C7	4	25	W-145645	PRS150/4	BBR5-25		TVA-13	Hor. Output Cath. Bypass
C8	4	450	W-145644	PRS450/4	BR445		UT-4	Hor. Output Screen Bypass
C9	1.5Ω at	60 ~	W-145561	PRS6/2000	BRH620		TVA-2	Vert. Cent. Cont. Bypass
C10	100	25	W-160073	PRS25/100	BRH251A		TVA-8	Hor. Cent. Cont. Bypass
C11	4	150	W-160036	PRS150/4	BR415		UT-41	Time Delay Filter
C12	500	25	W-160071	PRS25/500	BRH255A		TVA-10	Bias Filter
C13	470	500	W-160633-20	1468-0005	5W5T5	GP2K-470	1FM-35	RF Coupling
C14	470		W-160082			GP2K-470		RF Bypass
C15	15		W-160080			GP1K-15		RF Coupling
C16	2-12		W-160247			TS2A-N500-2-12		Variable Padder
C17	2-12		W-160247			TS2A-N500-2-12		Variable Padder
C18	15		W-160080			GP1K-15		RF Coupling
C19	470		W-160082			GP2K-470		Filament Bypass
C20	470		W-160082			GP2K-470		Mixer Screen Bypass
C21	2-12		W-160247			TS2A-N500-2-12		Variable Padder
C22	1		W-137398-2					Osc. Coupling
C23	5		W-160084			NPOK-5		Osc. Grid Cap.
C24	470	500	W-160633-20	1468-0005	5W5T5	GP2K-470	1FM-25	Filament Bypass
C25	470	500	W-160633-20	1468-0005	5W5T5	GP2K-470	1FM-25	RF Bypass
C26	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C27	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	Mixer Plate Decoupling
C28	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	IF Coupling
C29	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	Bias Filter
C30	.25	200	39001-87	P488-25	GT2P25		TC-2	Bias Filter
C31	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	1st V. IF Decoupling
C32	2.1		AW-160519					IF Coupling *
C33	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	Bias Filter
C34	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	2nd V. IF Decoupling
C35	20		W-160037		5R5Q2	NPOK-20	MS-42	Fixed Trimmer
C36	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	IF Coupling
C37	10		W-160083	1469-00001	5R5Q1	NPOK-10	MS-41	Fixed Trimmer
C38	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	3rd V. IF Cath. Bypass
C39	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	3rd V. IF Decoupling
C40	1.6		AW-160402					IF Coupling *
C41	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C42	47		W-160081	1469-00005	5R5Q5	NPOM-50	MS-45	Fixed Trimmer
C43	.05	400	39001-17	P488-05	GT4S5		TM-15	Video Coupling
C44	.5	400	39001-23	484-5	GT4P5		TC-5	Video Coupling
C45	270		W-160079	1468-00025	5W5T25	GP2K-270	1FM-325	DC Rest. Plate Bypass
C46	2.5		W-160078					S. IF Coupling
C47	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	AVC Filter
C48	2.5		W-160068					Fixed Trimmer
C49	4700	500	160636-14	1467-005	1D5D5	GP2M-0047	1FM-25	S. IF Screen Bypass
C50	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	S. IF Decoupling

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C51	47		W-160109	1469-00005	5R5Q5	NPOM-50	MS-45	Limiter Grid Filter
C52	1	200	39301-01	1F268-1			TM-1	AVC Filter
C53	1000		W-160034	1469-005	1W5D1	GP2L-001	1FM-21	Limiter Screen Bypass
C54	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	Limiter Decoupling
C55	47		W-160109	1468-00005	5W5Q5	GP1K-47	1FM-45	RF Bypass
C56	47		W-160109	1469-00005	5W5Q5	GP1K-47	1FM-45	RF Bypass
C57	1000		W-160034	1468-001	1W5D1	GP2L-001	1FM-21	De-emphasis
C58	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Tone Compensation
C59	.02	400	39001-80	P488-02	GT4S2		TM-12	Audio Coupling
C60	1	400	39001-19	P488-1	GT4P1		TM-1	AF Screen Bypass
C61	1	200	39001-19	P288-1	GT4P1		TM-1	Bias Filter
C62	.05	400	39001-17	P488-05	GT4S5		TM-15	Audio Coupling
C63	.002	600	39377-6	P688-002	GT6D2	GP2M-002	TM-22	De-emphasis
C64	.005	600	39001-11	P688-005	GT6D5	GP2M-005	TM-25	Output Plate Bypass
C65	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Sync. Coupling
C66	.05	200	39001-17	P288-05	GT2S5		TM-15	Sync. Coupling
C67	1	200	39001-19	P288-1	GT2P1		TM-1	2nd Sync. Amp. Screen Bypass
C68	.01	600	39001-13	P688-01	GT6S1	GP2-335-01	TM-11	Vert. Sync. Coupling
C69	.005	600	39001-11	P688-005	GT6D5	GP2M-005	TM-25	Integrator Net.
C70	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Integrator Net.
C71	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Vert. Osc. Grid
C72	6800		W-160067	1467-007	1D3D7	GP2-334-0068	1FM-27	RF Bypass
C73	1	400	39377-23	P488-1	GT4P1		TM-1	Vert. Discharge
C74	1	400	39001-19	P488-1	GT4P1		TM-1	Vert. Sweep Coupling
C75	47		W-160035	1468-00005	5W5Q5	GP1K-47	1FM-45	Hor. Sync. Coupling
C76	.01	400	39377-13	P488-01	GT4S1	GP2-335-01	TM-11	Fixed Trimmer
C77	.005	600	39001-11	P688-005	GT6D5	GP2M-005	TM-25	AFC Filter
C78	1	200	39001-19	P288-1	GT2P1		TM-1	AFC Filter
C79	.005	600	39001-11	P688-005	GT6D5	GP2M-005	TM-25	AFC Coupling
C80	10000	500	160635-18	1467-01	1D3S1	GP2K-335-01	1FM-11	Phase Shifter
C81	.05	200	39001-17	P288-05	GT2S5		TM-15	AFC Screen Bypass
C82	.005	600	39001-11	P688-005	GT6D5	GP2M-005	TM-25	Hor. Osc. Grid
C83	.05	400	39001-17	P488-05	GT4S5		TM-15	Hor. Osc. Screen Bypass
C84	330	500	160632-26	1468-00035	5W5T35	GP2K-330	1FM-335	Differentiator Net.
C85	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Hor. Sweep Coupling
C86	360	500	B-137498	1469-00035				Hor. Discharge
C87	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	Hor. Sweep Coupling
C88	1	200	39001-19	P288-1	GT2P1		TM-1	Damper Filter
C89	15	200	39001-19	P288-15	GT2P1		TM-1	Damper Filter
C90	5	400	39001-23	484-5	GT4P5		TC-5	Damper Filter
C91	500	10000	B-137477-1			410-500		Voltage Doubler Cap.
C92	500	10000	B-137477-1			410-500		HV Filter
C93	500	10000	B-137477-1			410-500		HV Filter
C94	.01	400	39001-13	P488-01	GT4S1	GP2-335-01	TM-11	RF Bypass
C95	1	200	39001-19	P288-1	GT2P1		TM-1	Pic. Tube Cathode Decoupling
C96	1	400	39001-19	P488-1	GT4P1		TM-1	Hor. Cent. Cont. Bypass
C97	.05	600	W-160077	P588-05	GT4S5		TM-15	Line Filter
C98	.05	600	W-160077	P588-05	GT4S5		TM-15	Line Filter

* Uses transmission line as capacitor.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	500KΩ	1/2	B-145566			Volume control and switch, tapped at 180KΩ.
R2A	25KΩ	1/2	C-145573	Bll-120 †		Contrast control, rear (Dual Concentric)
B	100KΩ	1/2		Bll-128 †		Brightness control, front
C	Shaft End			E187 †		Attach per instructions in "Concentrikit".
R3	1000Ω	25	B-145569		PW-25-1000	Focus control, Wire Wound
R4	10KΩ	1/2	W-145560	Qll-116	M-27-S	Horiz. Drive control
R5	500KΩ	1/2	W-160094-2	Qll-133	M-58-S	Vert. hold control
R6	2 Meg.	1/2	W-160094-3	Qll-139	M-83-S	Vert. size control
R7	1500Ω	2	W-160087	W-1500	43-1500	Vert. linearity control, Wire Wound
R8	25Ω	4	W-160089		10-25	Horiz. centering control, Wire Wound
R9	40Ω	2	B-145565		43-40CT	Vert. centering control, Wire Wound tapped at 20Ω

† Additonal parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED
R10	200Ω 5%	1/2	39375-32		MF Cathode
R11	10KΩ	2	39374-213		MF Plate
R12	12KΩ	1/2	39374-38		RF Plate Coil Shunt
R13	12KΩ	1/2	39374-38		Mixer Grid Coil Shunt
R14	1 Meg.	1/2	39374-61		Mixer Grid
R15	47Ω	1/2	39374-4		Mixer Cathode
R16	330KΩ	1/2	39374-55		Mixer Screen
R17	12KΩ	1/2	39374-38		Osc. Grid
R18	10KΩ	2	39374-213		Osc. Plate
R19	8200Ω 5%	1/2	39375-71		Mixer Plate Transformer Shunt
R20	47KΩ	1/2	39374-45		Mixer Plate Decoupling
R21	5600Ω 5%	1/2	39375-67		1st Video IF Grid
R22	68Ω	1/2	39374-11		1st Video IF Cathode
R23	6800Ω 5%	1/2	39375-69		1st Video IF Plate Coil Shunt
R24	22KΩ	2	39374-217		1st Video IF Decoupling
R25	22KΩ	2	39374-217		1st Video IF Decoupling
R26	1 Meg.	1/2	39373-92	BTS-1 Meg.	Bias Network
R27	10KΩ	1/2	39374-37	BTS-10K	Bias Network
R28	6800Ω 5%	1/2	39375-69		2nd Video IF Coil Shunt
R29	68Ω	1/2	39374-11		2nd Video IF Cathode
R30	10KΩ	1/2	39374-37		2nd Video IF Coil Shunt
R31	3900Ω	2	39374-208	BT-2-3900	2nd Video IF Decoupling
R32	3900Ω 5%	1/2	39375-63	BTS-3900-5%	3rd Video IF Coil Shunt
R33	100Ω	1/2	39374-13		3rd Video IF Cathode
R34	3900Ω	2	39374-208	BT-2-3900	3rd Video IF Decoupling

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
R35A	7000Ω	7	W-145559	AB-7000	Bleeder (Wire Wound)
B	2500	9.6		AB-3500	Voltage Dropping (Wire Wound)
R36	39KΩ 5%	1/2	39375-87		4th Video IF Coil Shunt
R37	4700Ω 5%	1/2	39375-65	BTS-4700-5%	Video Det. Diode Load
R38	22Ω	1/2	39374-5	BW-1/2-22	Voltage Divider
R39	15Ω	1/2	39374-3	BW-1/2-15	Bias Network
R40	120Ω	2	39374-190	BW-2-120	Bias Network
R41	100KΩ	2	39374-225	BT-2-100K	Video Amp. Screen
R42	100KΩ	2	39374-225	BT-2-100K	Video Amp. Screen
R43	3600Ω 5%	2	39375-358		Video Amp. Plate
R44	3300Ω	2	39374-207	BW-2-3300	Low Pass Filter
R45	10KΩ	1/2	39374-37	BTS-10K	DC Rest. Load
R46	470KΩ	1/2	39374-57	BTS-470K	Picture Tube Grid
R47	150KΩ	1/2	39374-51	BTS-150K	Voltage Divider
R48	220KΩ	1/2	39374-53	BTS-220K	Voltage Divider
R49	6800Ω 5%	1/2	39374-35	BTS-6800-5%	Voltage Divider
R50	100KΩ	1/2	39374-49		Sound IF Grid
R51	68Ω	1/2	39374-11		Sound IF Cathode
R52	33KΩ	1	39374-131		Sound IF Screen
R53	1000Ω	1/2	39374-25	BTS-1000	Sound IF Decoupling
R54	100KΩ	1/2	39374-49		Sound IF Grid Filter
R55	56KΩ	1/2	39374-46		Limiter Grid
R56	68Ω	1/2	39374-11		Limiter Cathode
R57	47KΩ	2	39374-221		Limiter Screen
R58	1000Ω	1/2	39374-25	BTS-1000	Limiter Decoupling
R59	10KΩ	1/2	39374-37	BTS-10K	Voltage Divider
R60	100KΩ	1/2	39374-49	BTS-100K	Disc. Diode Load
R61	100KΩ	1/2	39374-49	BTS-100K	Disc. Diode Load
R62	27KΩ	1/2	39374-42	BTS-27K	De-emphasis
R63	22KΩ	1/2	39374-41	BTS-22K	Tone Compensation
R64	330Ω	1	39374-195	BTA-330	Voltage Divider
R65	470KΩ	1/2	39374-57	BTS-470K	AF Grid
R66	100KΩ	1/2	39374-49	BTS-100K	AF Plate
R67	1 Meg.	1/2	39374-61	BTS-1 Meg.	AF Screen
R68	100KΩ	1/2	39374-49	BTS-100K	Voltage Divider
R69	470KΩ	1/2	39374-57	BTS-470K	Bias Network
R70	100KΩ	1/2	39374-49	BTS-100K	Output Grid
R71	2200Ω	2	39374-205	BT-2-2200	Output Decoupling
R72	2200Ω	2	39374-205	BT-2-2200	Output Decoupling
R73	8200Ω	2	39374-212	BT-2-8200	Voltage Dropping
R74	8200Ω	2	39374-212	BT-2-8200	Voltage Dropping
R75	39KΩ	1/2	39374-44	BTS-39K	1st Sync. Clipper Grid
R76	3300Ω	1/2	39374-31	BTS-3300	1st Sync. Clipper Plate
R77	33KΩ	2	39374-219	BT-2-33K	1st Sync. Clipper Decoupling
R78	6800Ω	1/2	39374-35	BTS-6800	Voltage Divider
R79	1.2 Meg.	1/2	39374-63	BTS-1.2 Meg.	2nd Sync. Clipper Grid
R80	10KΩ	1/2	39374-37	BTS-10K	2nd Sync. Clipper Plate
R81	100KΩ	1	39374-137	BTA-100K	2nd Sync. Clipper Screen
R82	22KΩ	1/2	39374-41	BTS-22K	Voltage Divider
R83	1.2 Meg.	1/2	39374-63	BTS-1.2 Meg.	Vert. Buffer Grid
R84	6800Ω 5%	1/2	39374-35	BTS-6800-5%	Vert. Buffer Cathode
R85	10KΩ	1/2	39374-37	BTS-10K	Integrator
R86	10KΩ	1/2	39374-37	BTS-10K	Integrator
R87	10KΩ	1/2	39374-37	BTS-10K	Integrator
R88	560KΩ	1/2	39374-58	BTS-560K	Vert. Osc. Grid
R89	470KΩ	1/2	39374-57	BTS-470K	Vert. Osc. Plate
R90	3900Ω 5%	1/2	39374-32	BTS-3900-5%	Vert. Peaking
R91	470Ω	1	39374-109	BTA-470	Vert. Output Cathode
R92	1.2 Meg.	1/2	39374-63	BTS-1.2 Meg.	Vert. Output Grid See Note 1
R93	470KΩ	1/2	39374-57	BTS-470K	Horiz. Sync. Disc. Load
R94	470KΩ	1/2	39374-57	BTS-470K	Horiz. Sync. Disc. Load
R95	470KΩ	1/2	39374-57	BTS-470K	Horiz. AFC Filter Network
R96	470Ω	1/2	39374-21	BTS-470	Horiz. AFC Grid
R97	10Ω	1/2	39374-1	BW-1/2-10	Horiz. AFC Cathode
R98	22KΩ	2	39374-217	BT-2-22K	Horiz. AFC Plate
R99	47KΩ	2	39374-221	BT-2-47K	Horiz. AFC Screen
R100	27KΩ	1	39374-130	BTA-27K	Voltage Divider
R101	47KΩ	1/2	39374-45	BTS-47K	Horiz. Osc. Grid
R102	5000Ω	10	W-160104-16	AB-5000	Horiz. Osc. Plate (Wire Wound)
R103	10KΩ	1	39374-125	BTA-10K	Horiz. Osc. Screen
R104	6800Ω	1/2	39374-35	BTS-6800	Differentiator
R105	220KΩ	1/2	39374-53	BTS-220K	Horiz. Discharge Grid
R106	150KΩ	1/2	39374-51	BTS-150K	Horiz. Discharge Plate
R107	180KΩ	1/2	39374-52	BTS-180K	Horiz. Discharge Plate
R108	150KΩ	1/2	39374-51	BTS-150K	Voltage Divider
R109	100Ω	1/2	39374-13		Parasitic Supp.
R110	270KΩ	1/2	39374-54	BTS-270K	Horiz. Output Grid
R111	100Ω	1/2	39374-13		Parasitic Supp.
R112	100Ω	1/2	39374-13		Parasitic Supp.
R113	47Ω	1/2	†		Parasitic Supp.
R114	47Ω	1/2	†		Parasitic Supp.
R115	100Ω	1/2	39374-13		Parasitic Supp.
R116	100Ω	5	W-160097-3	AB-100	Horiz. Output Cathode (Wire Wound)
R117	4700Ω	6	160056-2	AB-4500	Horiz. Output Screen (Wire Wound)
R118	10KΩ	2	39374-213	BT-2-10K	Horiz. Output Screen See Note 2
R119	10KΩ	2	39374-213	BT-2-10K	Horiz. Output Screen See Note 2
R120	33KΩ	2	39374-219		Current Limiting
R121	1 Meg.	1/2	AW-145742		HV Filter See Note 3
R122	3300Ω	1	39374-119	BW-1-3300	Filter See Note 4
R123	250Ω	7	W-145558	AB-250	Focus Coil Shunt (Wire Wound)
R124	47Ω	2	39374-185	BW-2-47	Voltage Divider
R125	2.2Ω	1	39304-8	BW-1-2.2	Time Delay Rect. Filament (Wire Wound)
R126	100KΩ	1	39374-137	BTA-10K	Bleeder
R127	100KΩ	1	39374-137	BTA-10K	Bleeder
R128	1280Ω	24.1	W-160199		Filter (Wire Wound)

† Part of T4.

Note 1. Some models use 2.2 Meg. resistor in this application.
Note 2. Add shorting strap across R118 and R119 to increase width of picture.
Note 3. Assembly of five 220KΩ, 2 Watt resistor in series, part No. 160324-18.
Note 4. Early production models use a 1000Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC at 2.6A	750VCT .320ADC 65VAC at .0107ADC	5VAC at 6A	5VAC at 2A	D-145609			
		SEC. 4 6.3VAC at 10.3A						

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	68Ω Tap at 38Ω	68Ω Tap at 2Ω	AC-160009-1				Hor. Sync. Disc. Trans.
T3	290Ω	SEC. 1 740Ω	D-160015-2				Vert. Block.-Sync. Coup. Trans.
		SEC. 2 600Ω					
T4	195Ω Tap at 35Ω	SEC. 1 4.2Ω Tap at .3A	AC-145902				Hor. Output Trans.
		SEC. 2, 3 ■■					
T5	575Ω	7Ω	W-160200	A-8115	A-3035	TSO-1	Vert. Output Trans.
T5A	13Ω		AC-145571	DY-1			Hor. Deflection Coil
B	65Ω						Vert. Deflection Coil
T7	490Ω		B-145563				Focus Coil

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T8	5000Ω	3.6Ω	270Ω	.3Ω	138132-2	A-3849 #	A-2902 #	R0-9	# Drill one new mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↵)	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.300A	84Ω	5 Henries	C-145676	C-2326 †	C-2991 †	TR-3300 †	† Drill new mounting holes.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	MEISSNER PART No.	NOTES
L2	Ant. Input	0Ω		AW-160018		
L3	RF End Inductor	0Ω		AW-160218		
L4	RF Plate	0Ω				Part of inductuner.
L5	Mixer End Inductor	0Ω		AW-160225		
L6	Mixer Grid	0Ω				Part of inductuner.
L7	Osc. End Inductor	0Ω		AW-160217		
L8	Oscillator	0Ω				Part of inductuner.
L9	Osc. Shunt	0Ω		AW-160054		
L10	1st Video IF	.7Ω		AW-145328		
L11	RF Choke	0Ω		AW-160020		
L12	1st Video IF Coupling	.7Ω		AW-145329		
L13	2nd Video IF	.7Ω		AW-145328		
L14	2nd Video IF	.7Ω		AW-145329		
L15	3rd Video IF	.7Ω		AW-145328		
L16	21.9MC Sound Trap	0Ω		AW-145330		
L17	Adjacent Channel Sound Trap	.1Ω		AW-145330		
L18	3rd Video IF	.7Ω		AW-145329		
L19	4th Video IF	.7Ω		AW-145328		
L20	4th Video IF	.7Ω		AW-145328		
L21	Peaking	14.5Ω		AW-160023-3		
L22	Peaking	18.2Ω		AW-160023-2		
L23	4.5MC Trap	1.2Ω		AW-160160		
L24	Peaking	10Ω		AW-160023-1		
L25	1st Sound IF	0Ω	0Ω	AC-160008		
L26	2nd Sound IF	0Ω	0Ω	AC-160008		
L27	Disc. Trans.	5Ω	0Ω	AC-160010		
L28	Hor. Linearity	7Ω		AW-145622		
L29	Hor. Size	.2Ω		AW-145621		

CROSLEY
MODELS 9-422M, 9-422MA

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

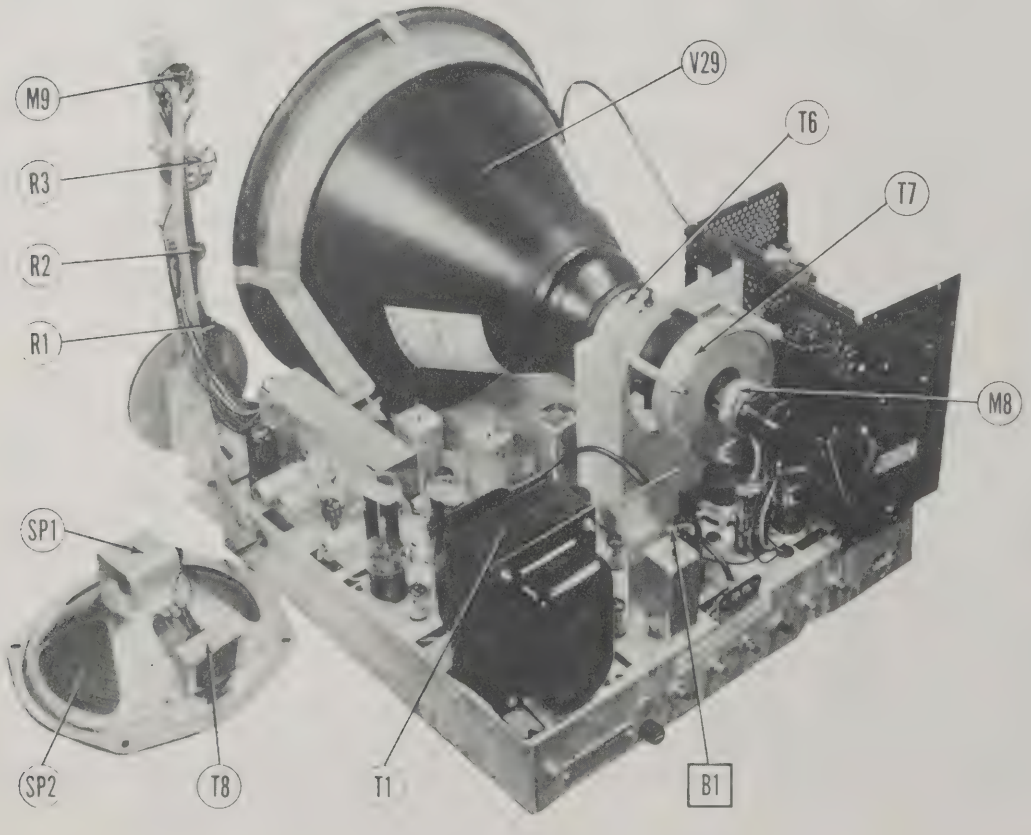
ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
			CROSLEY	JENSEN	QUAM	
	FIELD RES.	V. C. IMP.	PART No.	PART No.	PART No.	
SP1	PM	3.6Ω	138762-5	ST-119 † MOD. P10-T	10A31	† Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	V. C. DIA.				
SP2	9 3/8"	1"				

DIAL LIGHTS

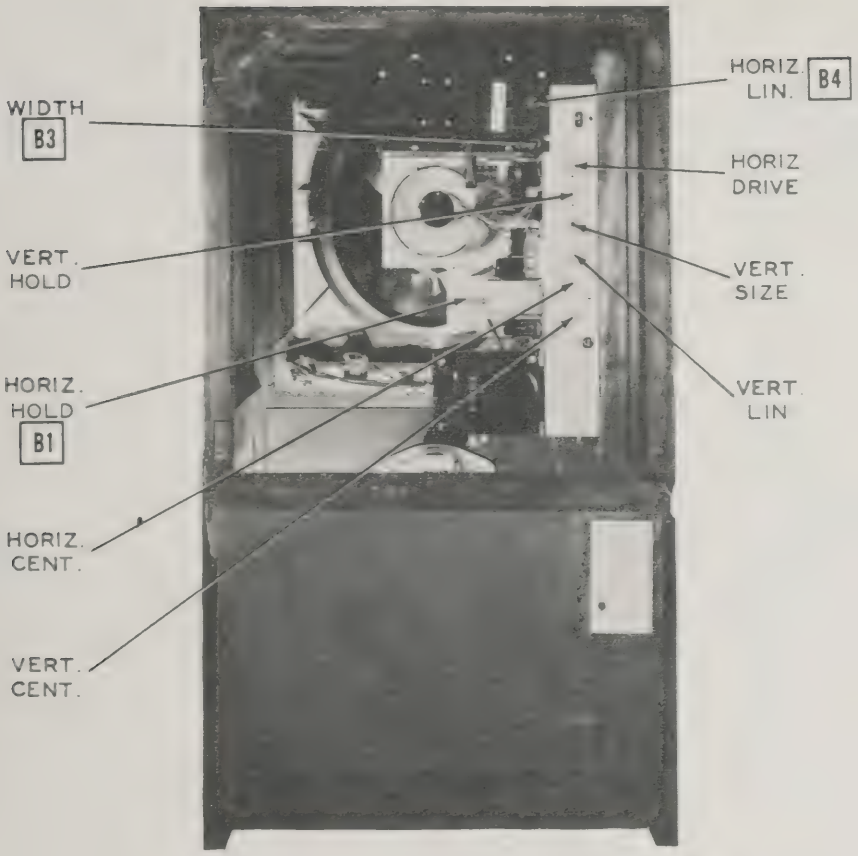
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					CROSLEY PART No.		
M1	Bayonet	6-8	.25	Blue	W-138437-8		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M3	RF Tuner	AW-160025	Complete Tuner
M4	Inductuner	AW-145582	Three Gang Variable Inductance
M5	Fuse	W-145366	3A
M6	Fuse	W-144898-2	Type GJC .3A
M7	Relay	W-160044	
M8	Ion Trap	W-145298	
M9	Phono-Band Switch	C-145572	
	Cabinet	R-146325	
	Safety Glass	C-145577	
	Core	W-160426	L10, L11, L12, L13, L14, L15, L18, L19, L20
	Core	39012-94	L16, L17
	Core	39012-91	L23
	Core	39012-85	L25 (Pri. & Sec.), L26 (Pri. & Sec.), L27 (Pri. & Sec.)
	Core	39012-95	T2 (Pri. & Sec.)
	Core	39012-92	L28, L29
	Knob	C-144599-2	Phono-FM-TV
	Knob	C-144599-2	Tuning, Focus, Off-On Volume
	Knob	C-143553-1	Brightness
	Knob	C-143422-1	Contrast
	Dial Prism	B-146258	
	Mask	R-145248	



CHASSIS-TOP VIEW



CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

1. Remove the five front panel control knobs.
2. Remove the 14 screws holding the rear cover.
3. Open the hinged rear cover and remove the four phillips head screws holding the hinges. Remove cover.
4. Disconnect the speaker plug.
5. Remove two screws holding the control mounting strip to the cabinet.
6. Remove four 7/16" hex head bolts holding chassis. Remove chassis.
7. Remove four 1/4" hex head nuts holding speaker. Remove speaker.

HORIZONTAL FREQUENCY ADJUSTMENTS

If the picture does not remain in synchronization horizontally, turn the horizontal hold adjustment (B1) and determine the two extreme positions where the picture drops into "sync" - not out os synchronization. Set B1 midway between these two positions.

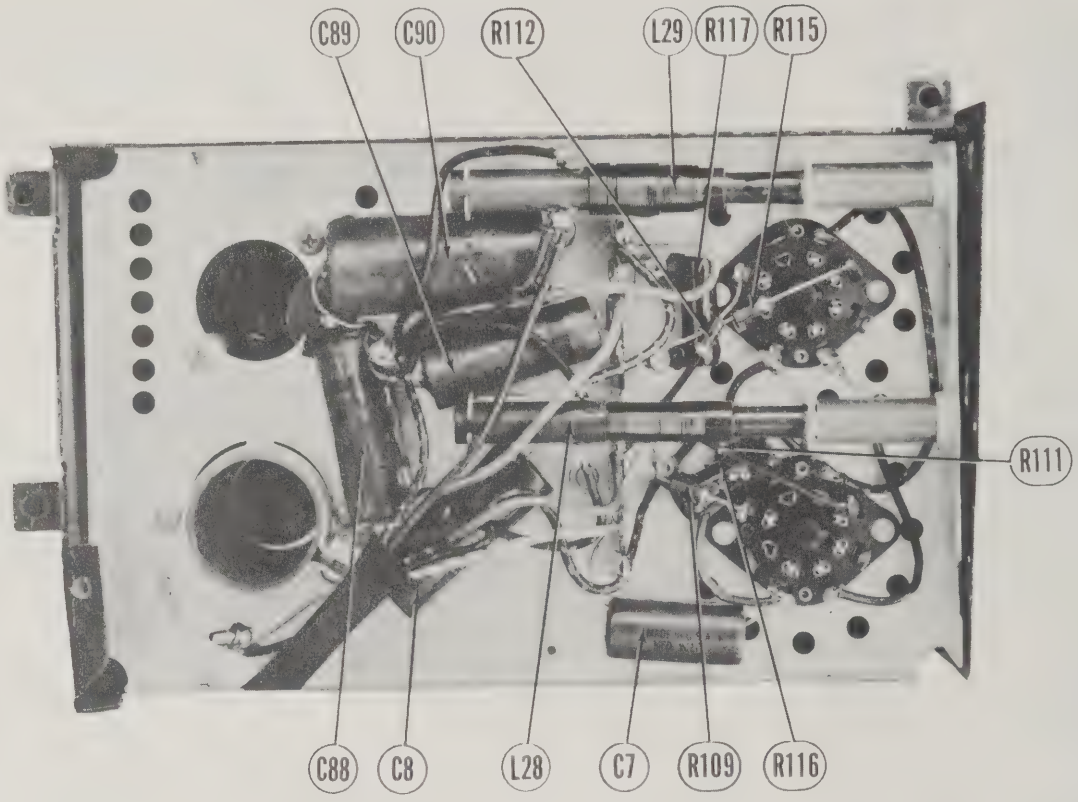
Turn the horizontal centering control until the raster is centered horizontally. Decrease the contrast control and increase the brightness control so the entire raster is visable including the area to the right which is usually blank out. Adjacent to the right edge of the picture there should be a vertical gray strip about 1/4" wide . Further to the right there may or may not be present a darker gray strip. If this strip is over 3/16" wide or if the first lighter gray strip is not present, the phasing is not correct. If so, turn the phasing control (B2) until the left edge of the darker strip is at the extreme right edge of the raster - almost to the disappearing point.

HORIZONTAL LINEARITY AND SIZE ADJUSTMENTS

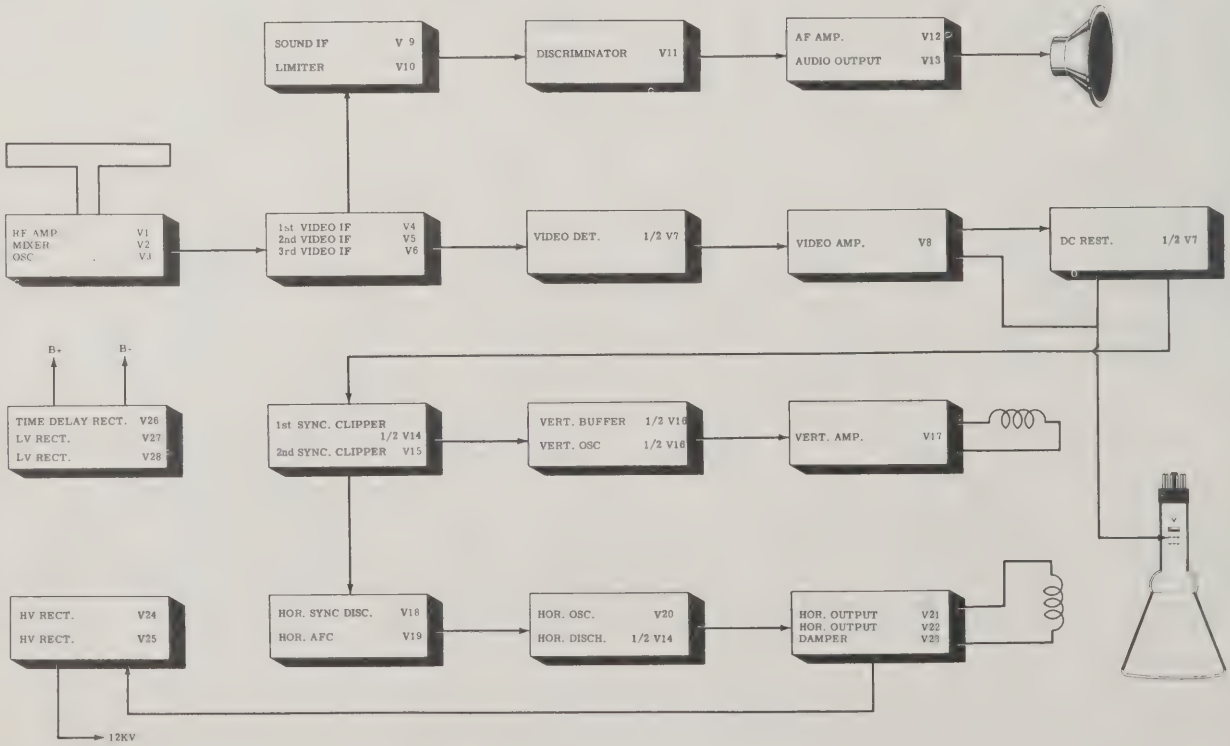
Adjust the horizontal size control (B3) so the picture is the same as the picture frame opening.

Adjust the horizontal drive control for the best linearity of pattern on the right side of the picture. (This control is pre-set at the factory factory and normally should not require adjustment in the field).

The horizontal linearity control (B4) affects the middle portion of the picture. Readjust the horizontal size control (B3) after the horizontal drive and linearity controls have been adjusted, if necessary.



HIGH VOLTAGE SUPPLY - BOTTOM VIEW



BLOCK DIAGRAM

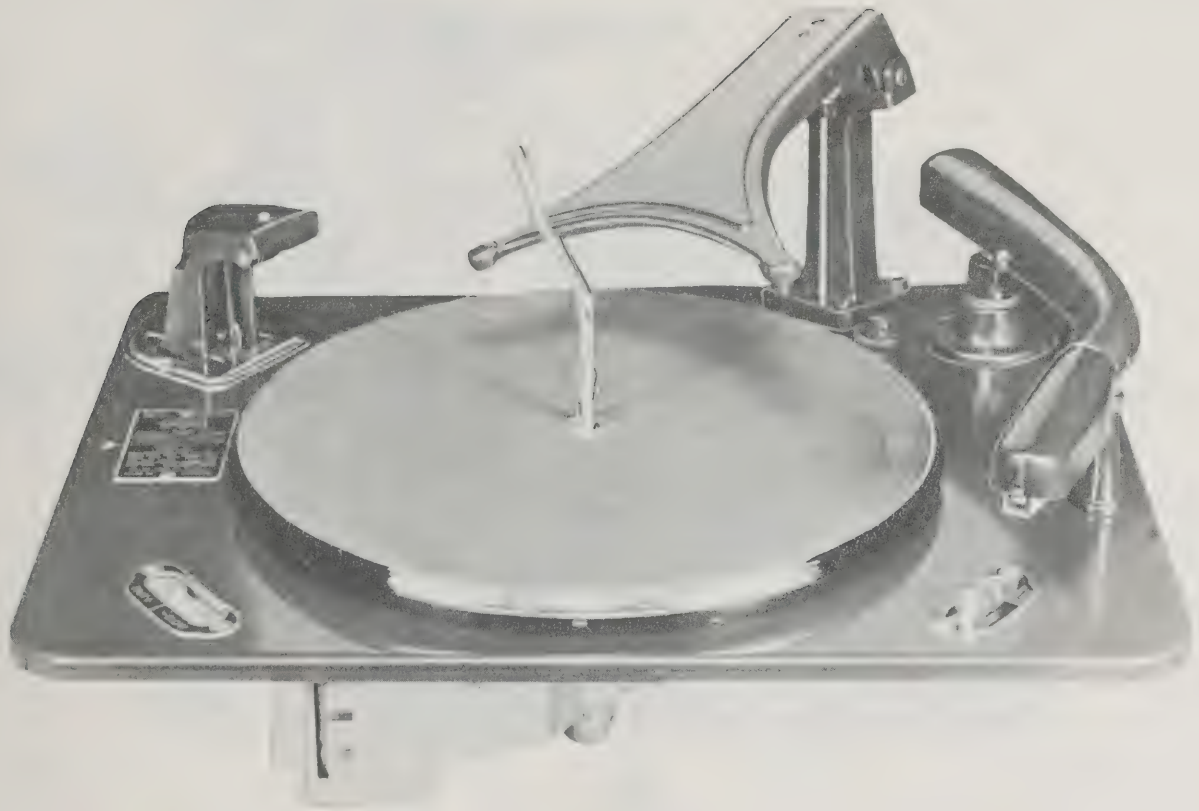


FIG. 1—TOP VIEW

GARRARD
MODEL RC60

GARRARD
MODEL RC60

GENERAL INFORMATION

The Garrard Model RC60 is a single-post mechanism, designed to automatically play up to eight 10-inch or 12-inch records, mixed in any order. This changer will shut off automatically at the completion of the last record. The changer has a specially designed spindle, which will not enlarge record holes and prevents slipping and skidding of records on the turntable.

Due to the wide voltage range of the motors, it may be necessary on some power supplies to make a slight re-adjustment of the speed indicator lever so that the turntable will have the proper speed of 78 R.P.M.

Manufactured by **THE GARRARD ENGINEERING AND MANUFACTURING CO., LTD.**
SWINDON: WILTS: ENGLAND

Distributor: **GARRARD SALES CORPORATION, 315 BROADWAY, NEW YORK 7, NEW YORK**

THIS CHANGER HAS BEEN USED IN POSTWAR PRODUCTION BY THE FOLLOWING MANUFACTURERS:

Barker Bros.....818 W. 7th Street, Los Angeles, California
Bel Canto
Fisher Radio Co.....41 E. 47th Street, New York, New York
Freed Radio Corp.....200 Hudson Street, New York, New York
London Gramophone
Pilot Radio Corp.....3706 36th Street, Long Island City, New York
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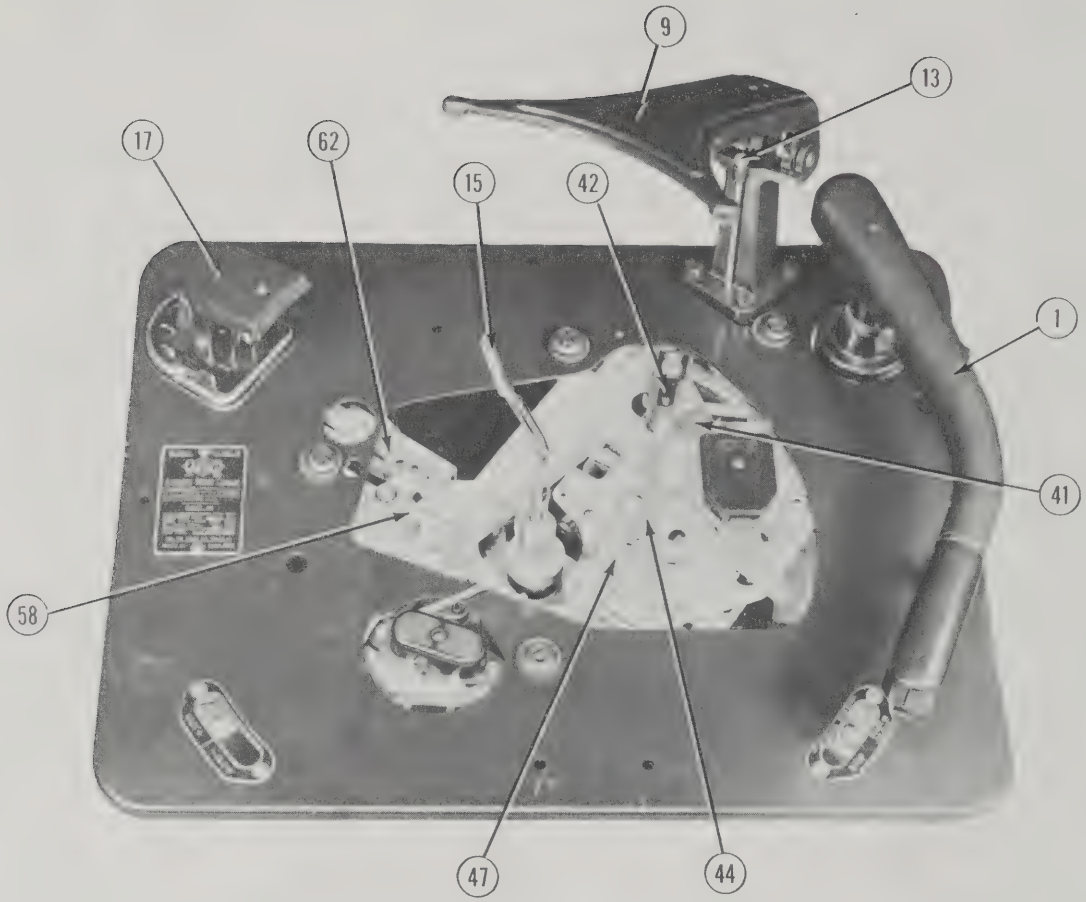


FIG. 2—TOP VIEW LESS TURNTABLE

OPERATING INSTRUCTIONS

1. If a permanent needle is not used in the pickup crystal, insert a needle of a good type. Turn the head of the pickup arm to insert the needle.

2. Raise the overarm (9) to its upward position.

3. Place the record spindle (15) in position, the sloping part leaning toward the record platform (17).

4. Place any number up to eight records, in any order, on the record spindle, letting them rest on the platform.

5. Lower the overarm (9) to the records.

6. Move the control knob (49) to the "Start" and "Reject" position. The changer will now play the entire stack of records and on completion of the last record, the pickup arm will return to the rest post and will automatically shut off.

Any record not required to be played may be automatically rejected by moving the control knob (49) to the "Reject" position and releasing.

The changer can be stopped by moving the control knob to the "Stop" position. Connected to the control lever and knob (49) is the reject mechanism. If the changer is switched off while playing a record, the reject comes into operation when switching on again. If there are no records on the platform when the changer is switched on, the pickup arm will swing out to its rest position and the changer will automatically shut off; otherwise, the next record will drop to the turntable and will be played.

NOTE: If the changer has been stopped for any reason, with the pickup arm not on the rest, the arm should not be interfered with but the motor should be restarted and the arm allowed to return to the rest.

Repeating Records

A record may be repeated by removing all the records on the off-set step of the spindle and leaving the overarm in a raised position.

Playing Record Manually

Home recordings, warped and odd-sized records should be played manually:

1. Raise the overarm (9) until it snaps into position.

2. Place a record on the turntable.

3. Push down on the pawl (18) and move the control knob to the "Start or Reject" position. Hold the pawl in the position until the platform (17) moves all the way back.

4. Hold the pickup arm off the turntable until the change cycle is completed; then place it on the record.

5. To shut the mechanism off, move the control knob to the "off" position and place the pickup arm on the rest post.

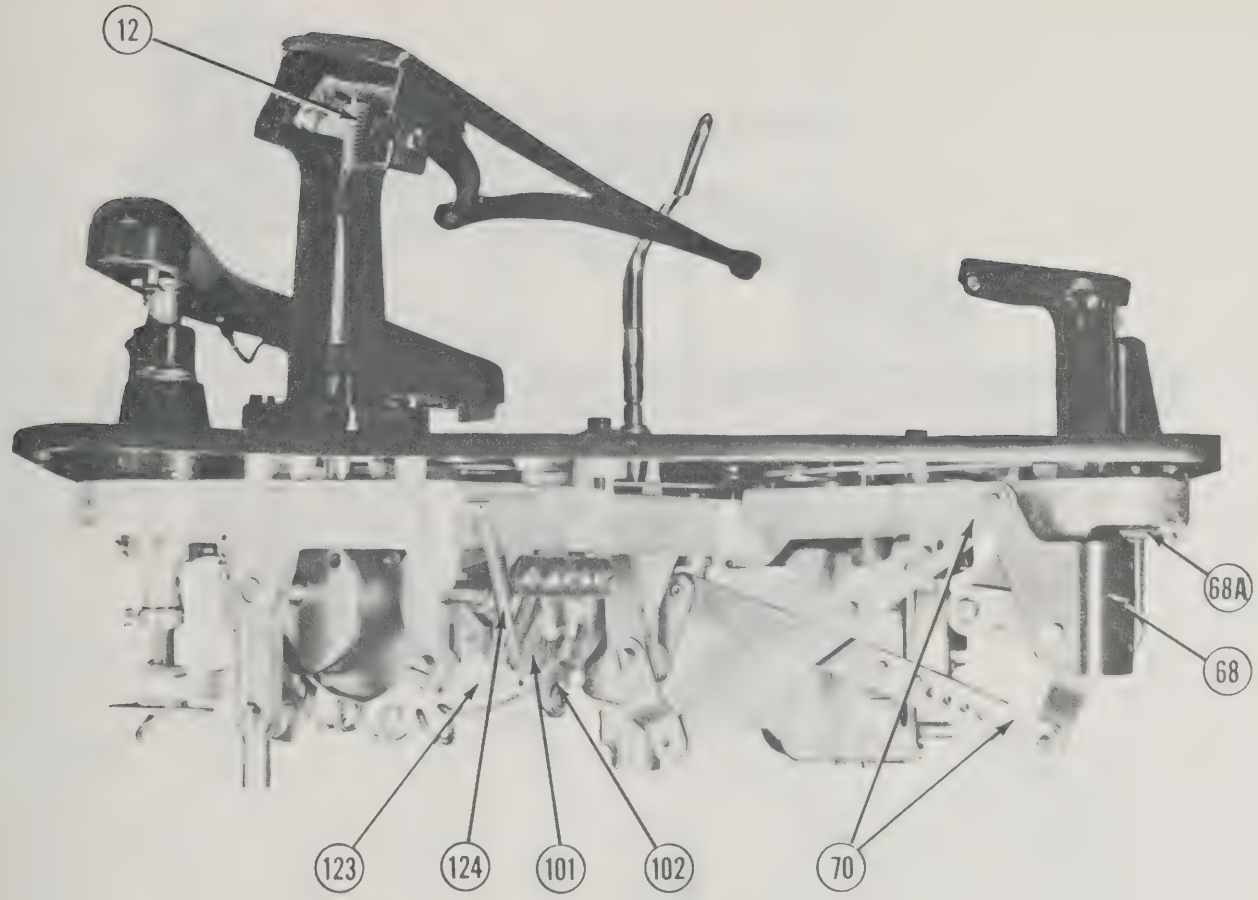


FIG. 3—BACK VIEW

CHANGE CYCLE

The change cycle may be started by either moving the switch control lever and knob (49) to the "Stop" or "Reject" position, or by any fast lead in movement of the pickup arm as it comes to within 2⅜" of the spindle.

1. By moving the switch control lever (49) to the "Start" or "Reject" position, the switch link (50), which is connected to the control lever, is moved against the stud of the switch lever unit (53). This actuates the switch unit which, in turn, engages the switch (54) and starts the motor assembly. The switch lever unit is latched in position by the release lever (51).

At the same time, the stud and finger of the switch link (50) contacts and moves the shutoff clutch lever (79) and the clutch tripping link (130) (seen in Fig. 4) from in front of the clutch lever (97). The shutoff lever (79) is latched in an outward position during the automatic operation by the shutoff clutch latch lever (81).

NOTE: If the mechanism has been stopped automatically, the clutch lever (97) will be blocked by the shutoff clutch link (79). If in playing operation (at the end of a cycle), the clutch lever will be blocked by the clutch tripping link (130). See Fig. 4.

2. As the pickup arm moves into the fast lead-in groove of the record, the mechanism is tripped by the velocity tripping mechanism.

The clutch lever (97), no longer blocked, engages the pinion of the motor assembly (109), which is in constant rotation. This causes the platform cam unit (96), the swing cam unit (92), and the lifting cam unit (86), which are fastened to the cam shaft (85), to turn as one unit. One complete revolution of the unit takes the changing mechanism through a complete change cycle.

The lifting lever unit (84) pushes down on the friction disc (91) as it rides around the lifting cam (86), thereby actuating the lifting tube unit raising the pickup arm from the record.

The swing cam (92) has now travelled far enough to move the lateral cam lever (129) against the pickup swing lever (87), thus swinging the pickup arm clear of the records. As the swing lever (87) moves out, it carries the positioner lever (89) with it by the spring (87A). This brings the positioner lever in contact with the pin on the selector lever (82). The automatic trip link (40) is carried with the swing lever (87) by the finger (87B), thus resetting the velocity tripping mechanism.

The platform cam lever (126), following the cam (96), actuates the platform (17), which, as a result, selects the records, sets the position for the pickup arm set down, and pushes the records off the spindle.

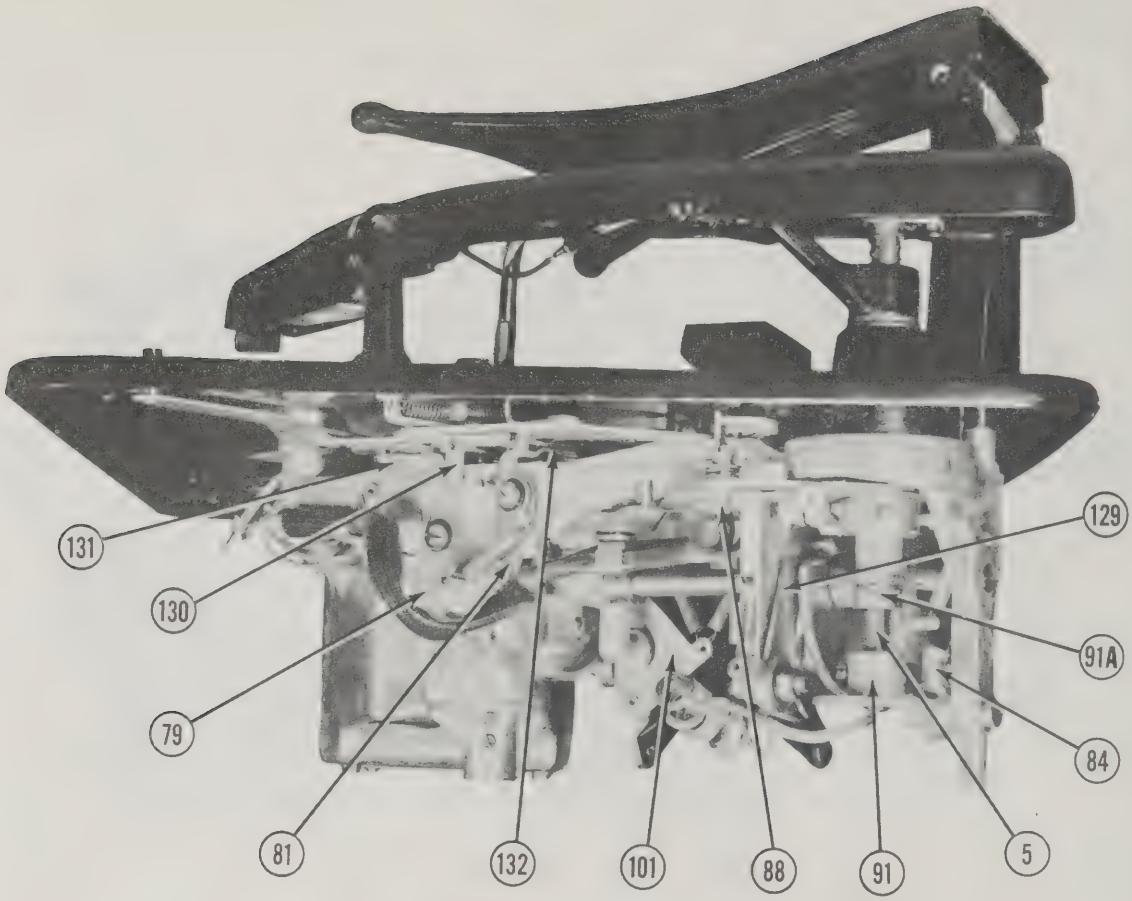


FIG. 4—RIGHT SIDE VIEW

The lateral cam lever (129), following cam (92), now moves away from the swing lever (87), thereby allowing spring (87A) to move the swing lever and, in turn, the pickup arm in until the eccentric pin (88) contacts the positioning lever (89), which positions the pickup arm for set down.

The friction of the lifting lever pad against the friction disc (91) holds the pickup arm in place as the pickup arm is lowered to the record by the action of the lifting lever (84).

The clutch lever (97) of the cam (96) moves against the clutch tripping link (130) disengaging the clutch lever from the pinion.

The overthrow lever (123) now engages the pin of the swing cam (92) preventing any backward movement of the unit. This completes the change cycle.

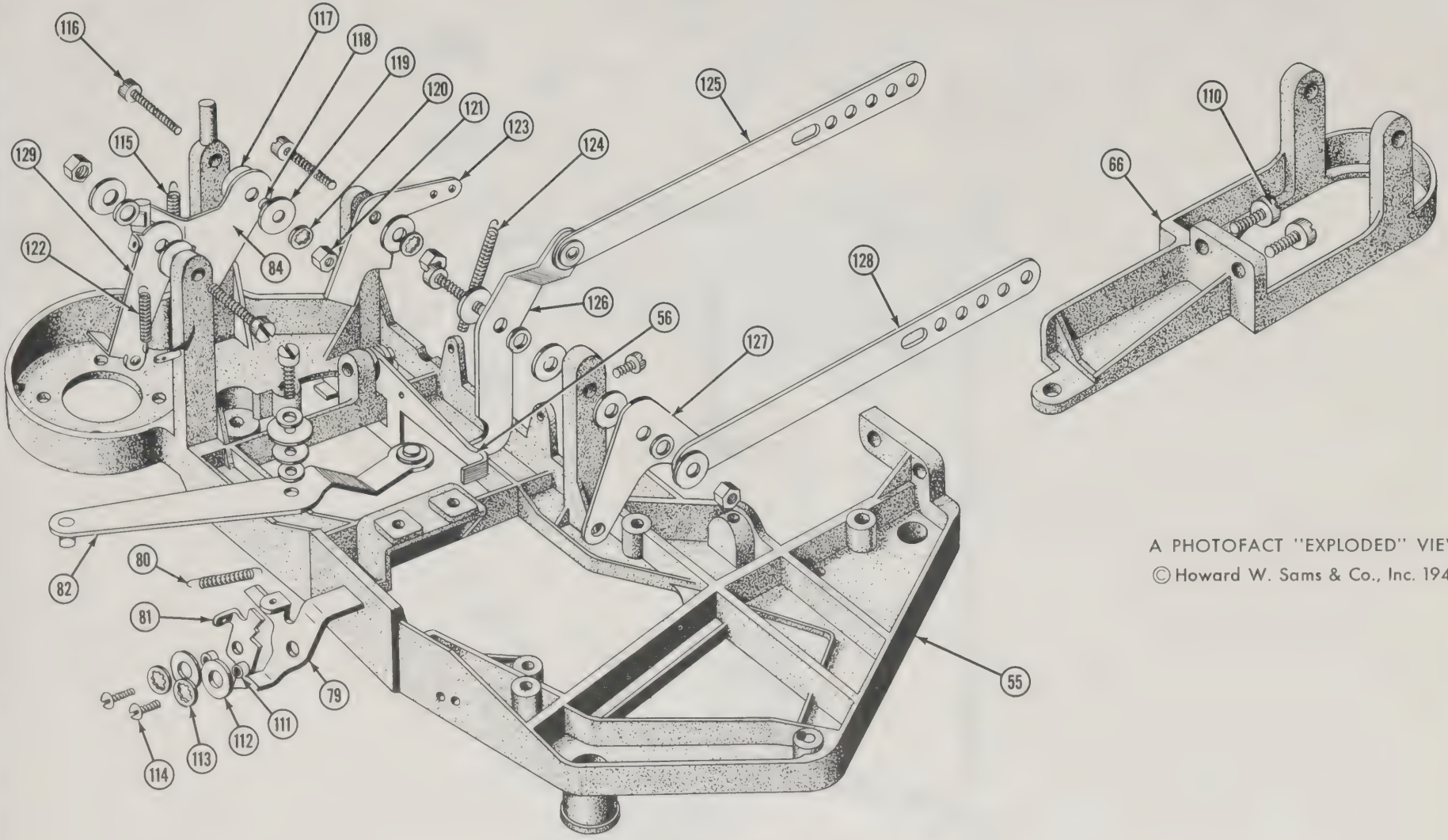
Determination of the Set-Down Point and Record Selection

With the presence of a 12-inch record on the platform (17), the pawl (18) will be depressed. This prevents the platform from being blocked for any backward movement; therefore, as the cam (96) rotates, the spring (68A) pulling on the platform lever (68) causes the pin of the cam lever (126) to follow the inner cam track of cam (96). As a result, the platform moves backward, moving the pawl (18) from under the 12-inch record. Connected to the platform unit is the selector operation lever (69), which, in turn, actuates the following connected parts, the delay lever (62), inter. selector lever (58), selector link (57), and the selector lever (82). This moves the pin of the selector lever (82) to point "A" of the positioner lever (89), thereby determining the 12-inch set-down point for the pickup arm.

The platform now moves forward. The pawl (18), now in a raised position, moves against the record pushing it off the platform and spindle dropping it to the turntable.

As the platform continues to move forward, it is tilted down by the action of the tilting cam lever (127). This is done to prevent the pawl (18) from striking the next record and pushing it off the platform; that is, if the next record is a 10-inch record. The platform now returns to its normal raised position.

With a 10-inch record on the platform, the pawl (18) will be in its normal raised position; therefore, any backward movement of platform will be blocked by the platform stop (64) as the end of the pawl moves against it. Blocking of the platform causes the platform cam lever (126) to move around the cam instead of in the groove. The platform now moves forward pushing the 10-inch record off the platform, thus dropping it to the turntable. As the platform moves forward, the positioning mechanism is actuated, moving the pin of the selector lever (82) into step "B" of the positioner lever



EXPLODED VIEW—SUBASSEMBLY

A PHOTOFACT "EXPLODED" VIEW

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A PHOTOFACT "EXPLODED" VIEW

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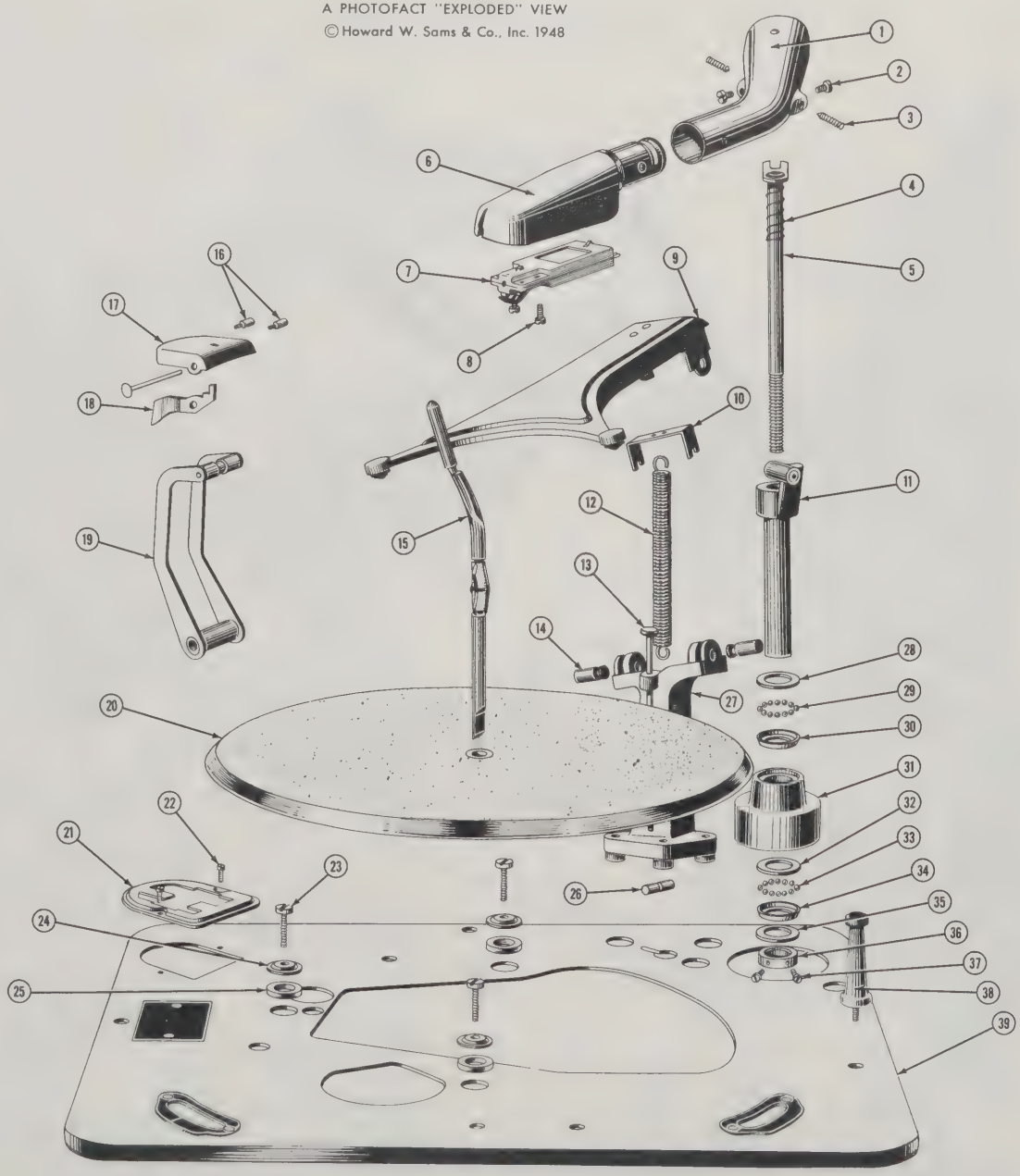

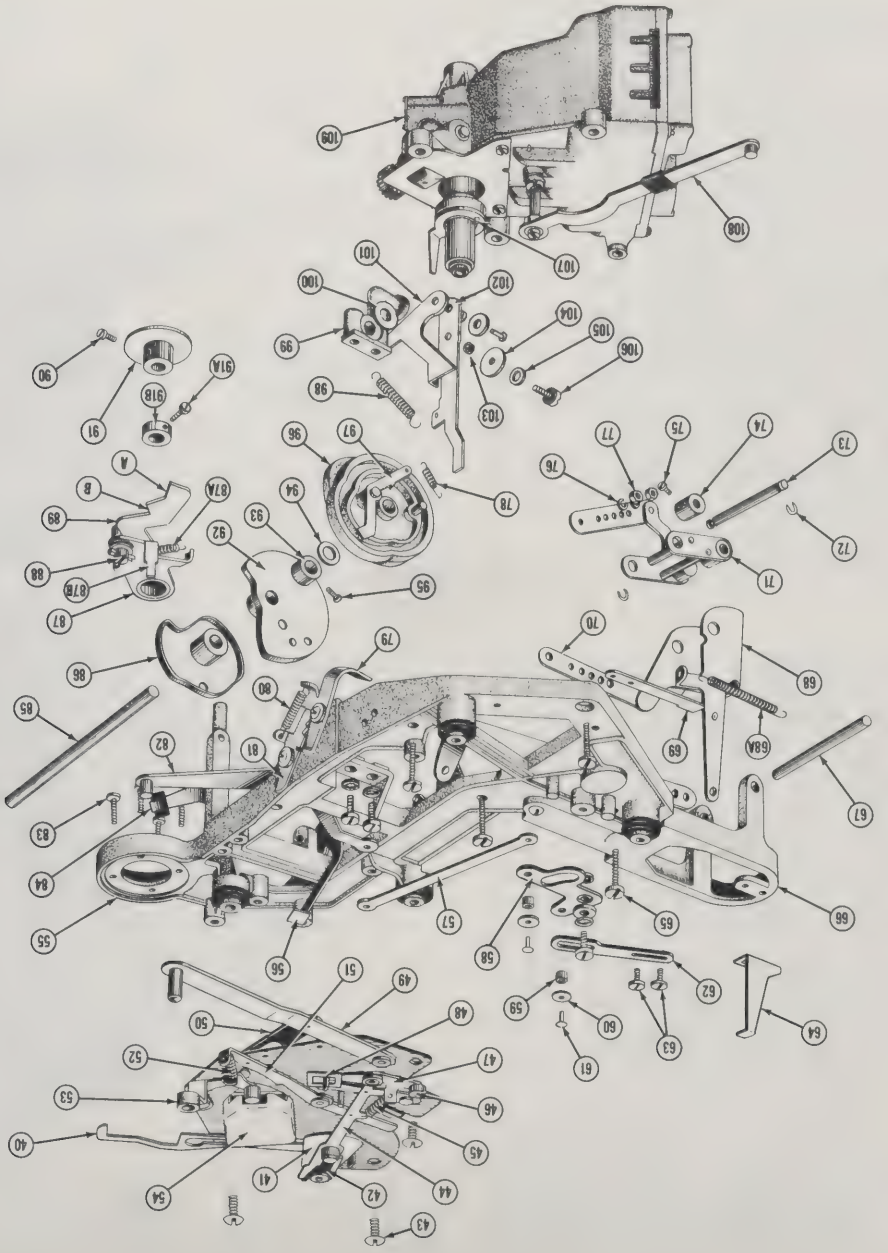
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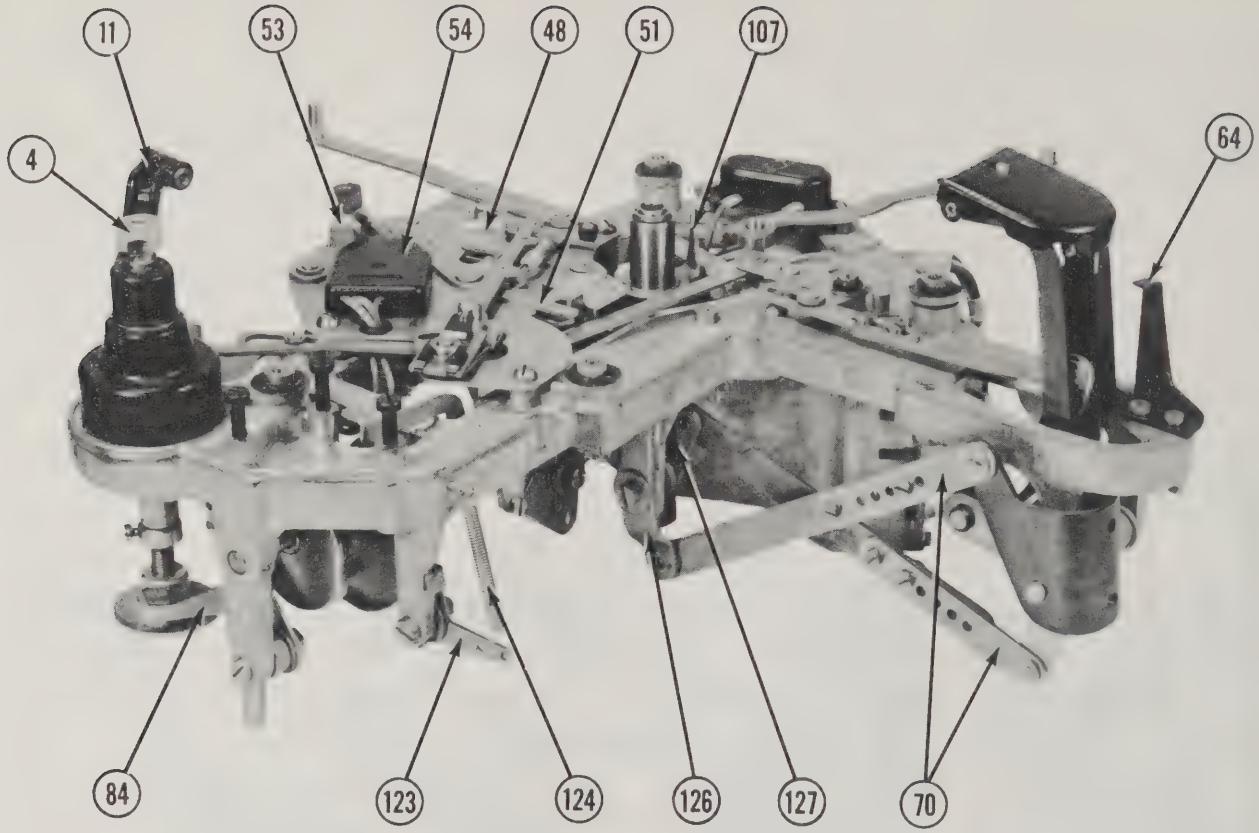


FIG. 5—BACK VIEW—UNDER CHASSIS ASSEMBLY

(89), thereby setting the mechanism for 10-inch set down.

Velocity Trip

The finger (87B) of the pickup swing lever (87) contacts and moves the automatic trip link (40) as the pickup arm moves to approximately 2⅜″ of the spindle. The trip link then actuates the friction plate (41), which, in turn, pivots (by friction) the operation lever (44) and trip lever (47) toward the striker. The motion is very slow due to the needle following the playing groove of the record. This allows the striker to slightly hit the rubber pad (46) of the trip lever (47), causing the operation lever to be slipped on the friction plate; however, when the pickup arm moves into the fast lead in groove of the record, the trip lever will be moved into the path of the striker. The striker then hits the trip lever (47) causing the clutch release lever (48) and the tripping link (130) to be actuated. This trips the mechanism and starts a new cycle.

Automatic Shutoff

Normally, the shutoff link (102) is blocked by the shutoff release lever (56); i.e., when there are records on the spindle or the overarm is in a raised position.

When the last record has dropped to the turntable, the overarm drops down pushing the shutoff pin (13) against the shutoff release lever (56). This pivots the release lever (56) away from the shutoff link (102). When the last record has finished playing, the mechanism is tripped returning the pickup arm to a rest position on the arm rest (38). At this point a boss on the platform cam (96) moves against the shutoff actuating lever (101), and, as a result, the actuating lever, through the spring (98), pulls the shutoff link (102) against switch release lever (51) and the shutoff clutch link (132). The release lever shuts off the switch while the clutch link trips the shutoff clutch levers (81) and (79), thereby allowing lever (79) to block the cam clutch lever (97) and disengage the cam clutch lever from the pinion; this completes the shutoff cycle.

ADJUSTMENTS

Pickup Arm Height

If the pickup arm does not set down on the first record, the following adjustment can be made:

1. Loosen the set screw (91A) and rotate the adjustment collar (91B). Counterclockwise will lower the pickup arm while a clockwise rotation will raise the arm.

(a) This adjustment should be made with the changer out of cycle.

CAUTION: There should be no friction between the pad of the lifting lever (84) and the friction disc (91) when the changer is out of cycle. This is

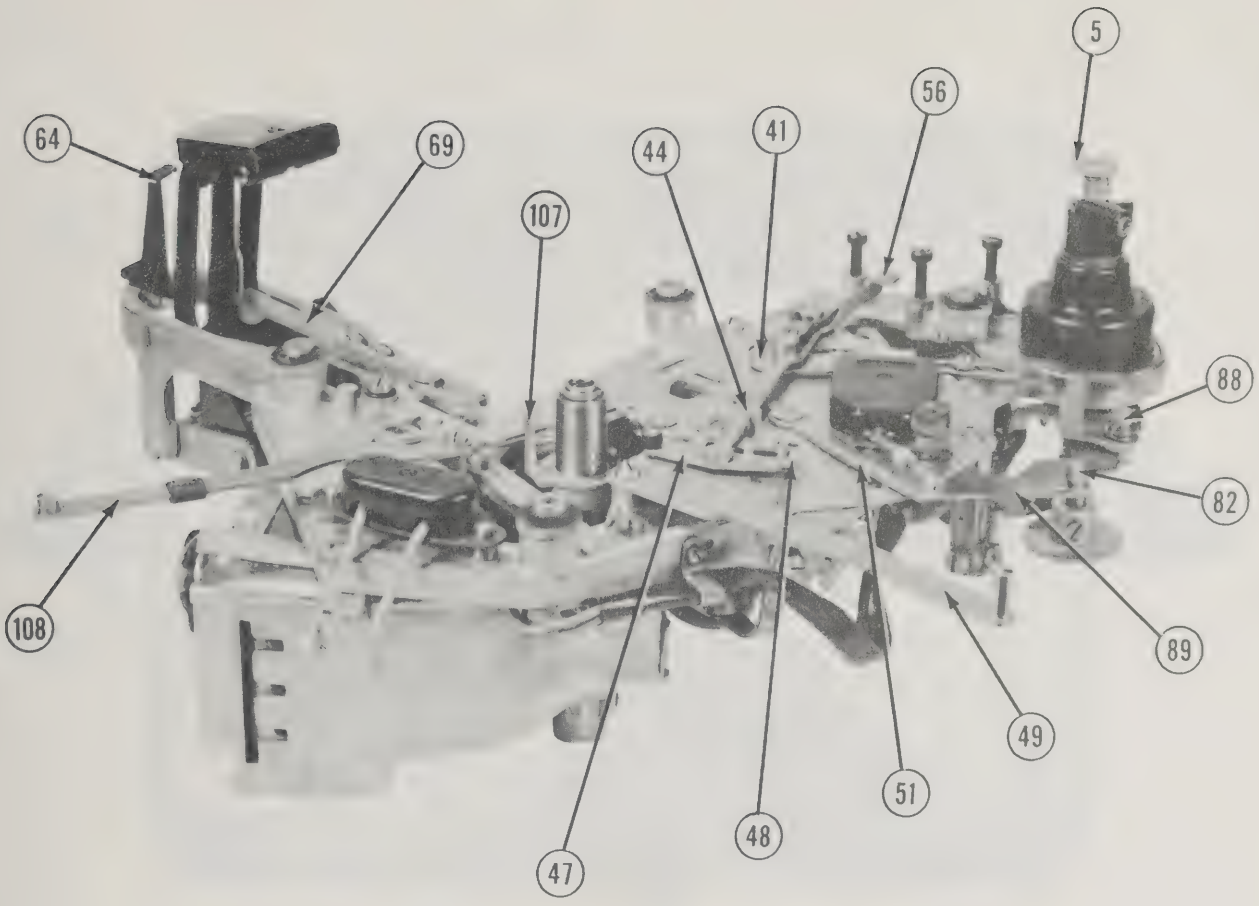


FIG. 6—FRONT VIEW—UNDER CHASSIS ASSEMBLY

to allow free movement of the pickup arm across the record.

If the pickup arm does not clear the top record of a stack of eight records or the top of the arm rest (38), the following adjustment can be made:

1. Loosen the set screw (90) and turn the friction disc (91). Counterclockwise will lower the arm; clockwise will raise the arm. This adjustment is made when the pickup arm is at its maximum height during the change cycle. After the adjustment is made, tighten the set screw and rotate the turntable clockwise until the changer is out of cycle. Check the pad of the lifting lever (84) and the friction disc (91); there should not be any friction between these two parts.

Pickup Arm Set-Down Point

If, for any reason, the pickup lever unit (87) has been removed, the pickup set-down point may be readjusted by the following procedure:

1. Place a 10-inch record on the turntable.
2. With the changer out of cycle, place the pickup arm so that the needle will be in the starting groove of the record.
3. Push up on the lever unit (87) so that it does not bind on any parts.
4. Move the positioner lever (89) against the pin of the selector lever (82), being sure that the pin of selector lever engages the positioner lever at point "B" of lever (89).
5. Tighten the set screws and check the adjustment.
6. A finer adjustment can now be made by turning the eccentric pin (88).

(a) To make this adjustment, place the pickup arm on the rest. The eccentric pin may be adjusted through the hole in the base plate. A quarter of a turn in either direction will give the maximum adjustment. After this adjustment has been made, switch on the changer and check the dropping position and readjust, if necessary.

Record Platform Adjustment

The platform has been properly adjusted at the factory to accommodate records of average size.

If, for any reason, the platform and its coupling links (70) have been removed, they may be replaced and properly adjusted, as seen in Figures 3 and 5.

The bottom link, which pivots at the bottom of the tilting lever (71), controls the platform lift, while the top link controls the distance the platform moves inward.

Automatic Trip

If the changer does not trip when the pickup arm moves in the eccentric groove of the record, the tension of the friction spring (42) must be increased. To make this adjustment, remove the turntable and turn the friction adjusting screw in a

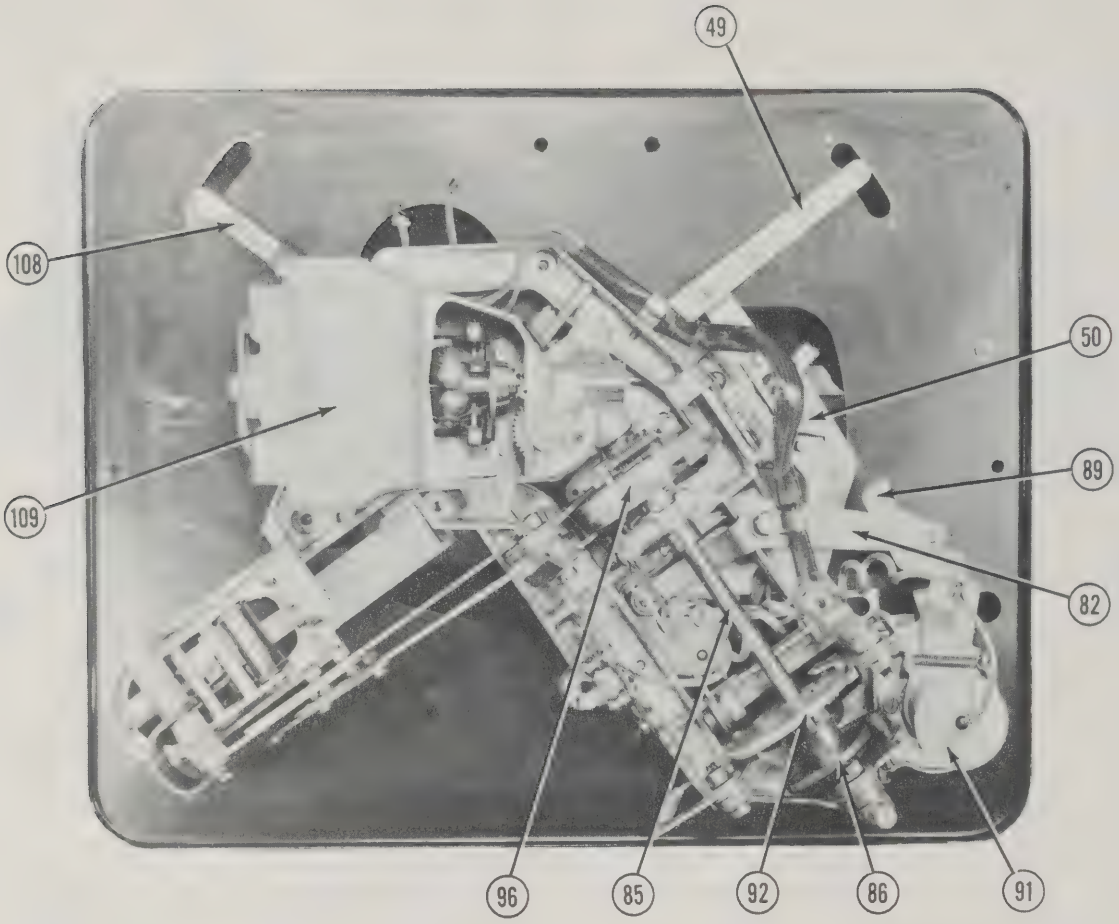


FIG. 7—BOTTOM VIEW

counterclockwise direction; about half a turn is all that should be necessary.

If the changer trips before the end of a record, the tension of the spring should be decreased.

TROUBLES

Pickup Arm Height Incorrect

1. See adjustment on "Pickup Arm Height."

Pickup Does Not Land Correctly on the Record

1. See adjustment on "Pickup Arm Set-Down Point."
2. Spring (87A) loose or missing.
3. Binding in the pickup arm spindle.

Continuous Cycling

The continuous cycling of the changer may be caused by:

1. Spring (131) of the clutch tripping link missing. Fig. 4.
2. Reject mechanism binding.

The Changer Does Not Trip at the End of a Record

1. See adjustment on "Automatic Trip."
2. Spring (78) missing.

The Changer Does Not Shut Off After Last Record

1. Spring (98) loose or missing.
2. Spring (80) loose or missing.
3. Lever (79) binding.

At the End of a Change Cycle, a Continuous Clicking Is Heard

1. Spring (124) of the overthrow lever (123) loose, allowing back lash of the control shaft and units. This allows the clutch lever (97) to slip over the teeth of the pinion.

LUBRICATION

Use a few drops of light machine oil on the following parts:

1. The ball bearings (29) and (33) of the pickup arm spindle.
2. The motor bearings, made accessible when removing the turntable.

Use a light grease on the following:

1. Switch lever unit 53.
2. Shutoff switch lever release (51).
3. Switch link (50).

CAUTION: Do not let any oil come in contact with the friction plate (41). Avoid overlubrication.

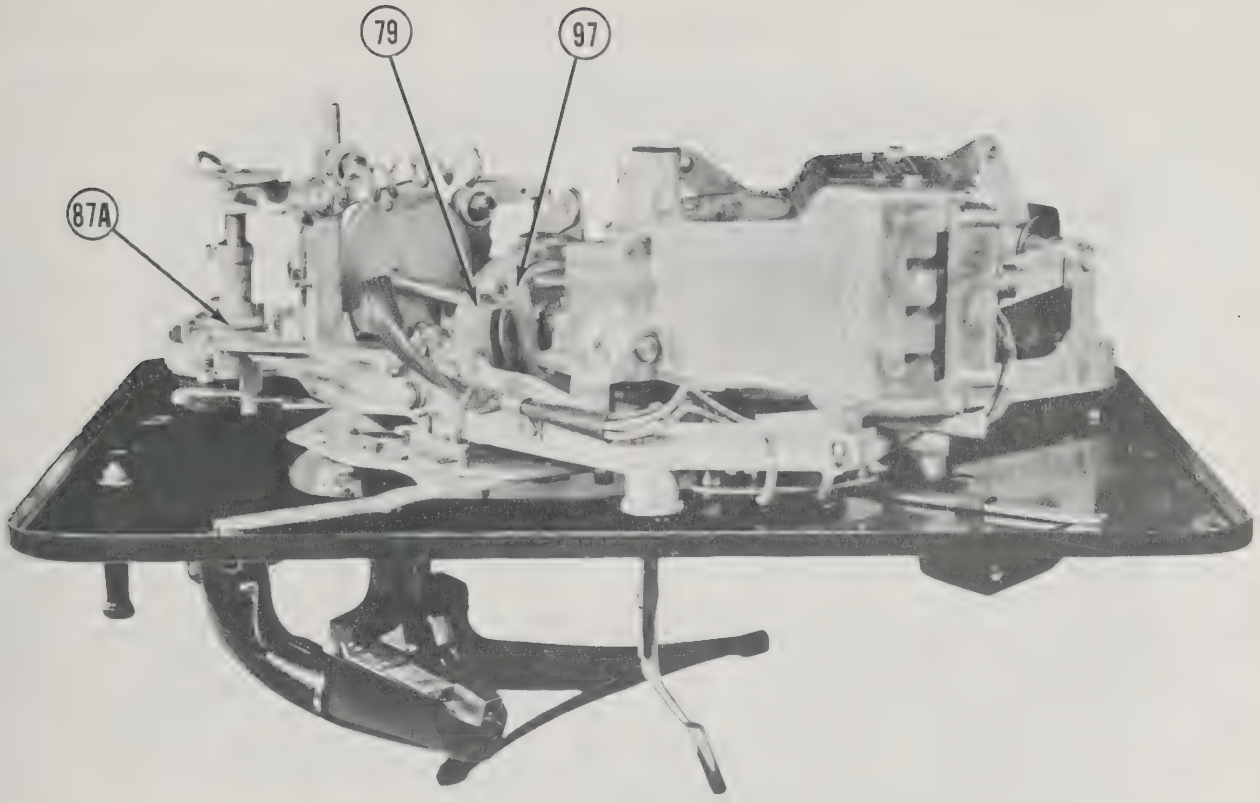


FIG. 8—BOTTOM FRONT VIEW

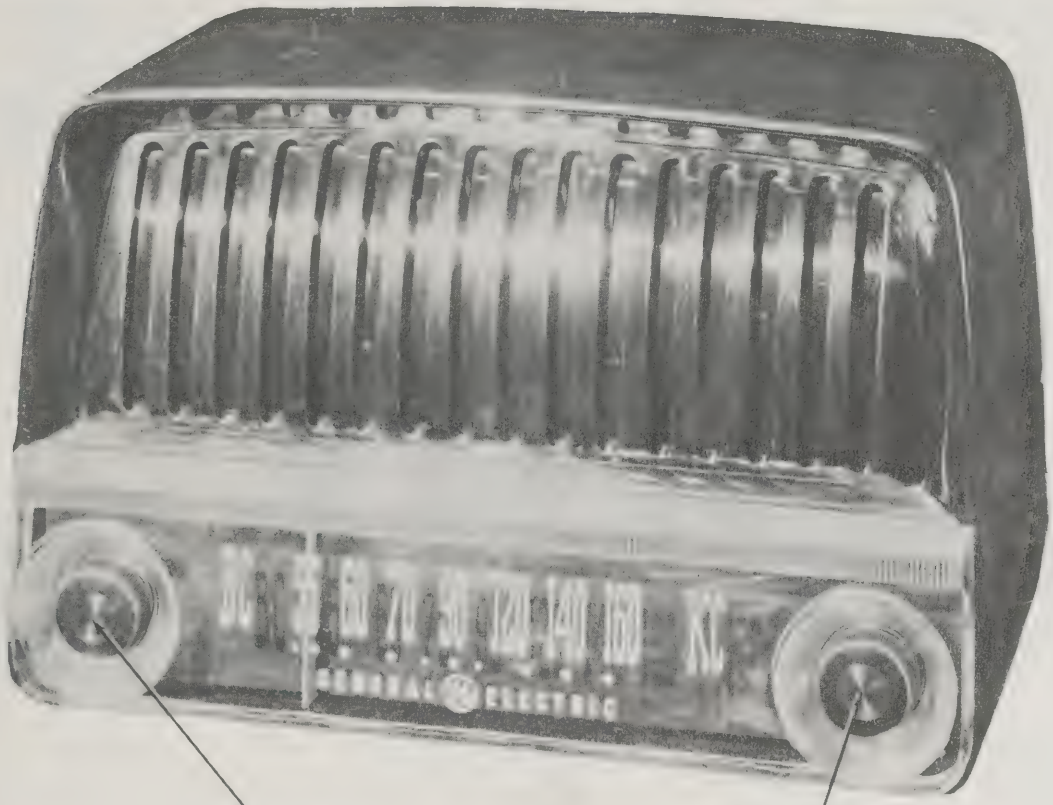
PARTS LIST

Ref. No.	*Part No.*	DESCRIPTION	*Ref. No.*	*Part No.*	DESCRIPTION
1	A45125	Pickup arm complete with pin	22	A40038	Screw
2	A40020	Locking screw		A41008	Nut
3	A40019	Pivot screw	23	A40018	Sub-assembly mounting screw
4	A1504	Spring	24	A40508	Steel washer
5	A45134	Lifting tube unit	25		Rubber grommet
6		Pickup head	26		Grooved pin for overarm spring
7		Cartridge	27	A45115	Overarm bracket
8		Cartridge mounting screw	28	A40510	Thrust washer
9		Overarm	29	A43200	Ball bearings
10	A45121	Spring lever	30	A45144	Ball race
11	A45130	Pickup arm spindle	31	A45143	Pickup base
12	A45119	Overarm spring unit	32	A40510	Thrust washer
13	A45116	Shutoff pin	33	A43200	Ball bearings
14	A45123	Pivot pin	34	A45144	Ball race
15	A45380	Record spindle	35	A40510	Thrust washer
16	A40030	Screw	36	A45145	Retaining collar
17	A45150	Platform	37		Set screws for retaining collar
18	A45169	Pawl	38	A45276	Pickup rest
19	A45151	Platform support unit	39	C45102	Base plate
20	A45390	Turntable	40	A45184	Automatic trip link
21	A45263	Platform cover	41	A45516	Friction plate

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
42	A41513	Friction spring
43	A40033	Screw
44	A45173	Operation lever unit
45		Trip lever spring
46	A45179	Rubber pad
47	A45521	Trip lever and pin
48	A45185	Clutch release lever with pin
49	A45189	Switch control lever and knob
50	A45192	Switch link
51		Shut-off switch lever release
52	A41506	Spring
53	A45193	Switch lever unit
	A45199	Brake pad
54	A45201	Switch block
55	C45256	Base casting
56	A45260	Shut-off release lever
57	45234	Selector link
58	A45235	Inter. selector lever
59	A45161	Collar
60	A40514	Washer
61	A42005	Rivet
62	A45236	Delay lever
63	A40031	Screw
64	A45170	Platform stop
65	A40018	Motor mounting screw
66	B45168	Platform bracket
67	A45165	Pivot pin
68	B45163	Platform lever
68A	A41508	Spring
69	A45164	Selector operation lever
70	A45160	Coupling link (short)
71	A45155	Tilting lever unit
72		"C" clamp
73	A45165	Pivot pin
74	A45168	Operating collar
75	A40024	Screw
76	A42501	Spring washer
77	A41012	Nut
78	A41506	Spring
79	A45262	Shut-off clutch lever
80	A41503	Spring
81	A45261	Shut-off clutch lever
82	A45231	Selector lever with pin
83	A40023	Pickup base mounting screw
84	A45268	Lifting lever unit
	A45858	Lifting lever pad
85	A45219	Cam shaft
86	A45223	Lifting cam unit
87	A45241	Pickup arm lever unit (positioner lever 89 and pickup swing lever 87)
87A	A41506	Spring
88	A45245	Eccentric pin
	A42502	Spring washer
89		Positioner lever (part of item 87)
90	A40021	Fixing screw
91	A45265	Friction disc unit
92	A45227	Swing cam unit
93	A45222	Cam shaft collar
94		Flat washer
95	A40024	Screw
96	A45213	Platform cam unit
97	A45216	Clutch lever
98		Shut-off link spring
98A		Shut-off release lever spring
99	A45221	Cam shaft bearing
100		Flat washer
101		Shut-off actuating lever
102		Shut-off link
103		Collar
104		Flat washer
105		Shakeproof washer
106		Screw
107	A45376	Striker assembly
108	A45387	Regular lever with knob and rubber sleeve
109		Motor assembly
110	A40028	Platform mounting screw
111	A45161	Collar
112	A40504	Washer
113	A42520	Shakeproof washer
114	A40183	Screw
115	A41503	Spring
116	A40025	Screw
117	A45274	Distance collar
118	A45161	Collar
119	A40512	Washer
120	A42520	Shakeproof washer
121	A41006	Nut
122	A41503	Spring
123	A45227	Overthrow lever
124	A41503	Spring
125	A45249	Coupling link (long)
126	A45246	Sub-assembly platform cam lever
127	A45250	Sub-assembly tilting cam lever
128	A45249	Coupling link (long)
129	A42558	Pickup lateral cam lever unit
130		Clutch tripping link
131	A41503	Spring
132		Shut-off clutch link

GENERAL ELECTRIC
MODELS 135, 136



GENERAL ELECTRIC
MODELS 135, 136

GENERAL ELECTRIC MODEL 135

TRADE NAME	General Electric, Models 135, 136
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, New York
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 12SA7 Converter, 12SK7 IF Amp., 12SQ7 DET-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	105-125 Volts AC — RATING: .26 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 8 (Grid) of 12SA7 (V1). Low side to chassis.	455KC (400 ~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output
3.		Loop	1500KC	Tune for max. output.	"	A6	"

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		GENERAL ELECTRIC PART No.	STANDARD REPLACEMENT		
V1	Converter	12SA7	12SA7	8R	
V2	IF Amp.	12SK7	12SK7	8N	
V3	DET.-AVC-AF	12SQ7	12SQ7	8Q	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	50	150	RCE-050	PRSA150/50-50	EDL5515		TA-505	Filter Red
B	50	150						Filter Red
C2	.05	400	UCC-028	P488-05	GT4S5		TM-15	AVC Filter
C3	47		UCU-020	1468-00005	5W5Q5	GP1K-47	1FM-45	Osc. Grid Cap.
C4A	220		RCW-3013	1468-00025	5W5T25	GP2K-220	34C3	Diode RF Filter
B	2000			P688-002	GT6D2	GP2M-002		Audio Coupling
C	220			1468-00025	5W5T25	GP2K-220		AF Amp. Plate Bypass
D	5000			P688-005	GT6D5	GP2M-005		Audio Coupling
C5	.02	600	UCC-631	P688-02	GT6S2			Output Plate Bypass
C6	.05	400	UCC-028	P488-05	GT4S5			Line Isolation
C7	.05	600	UCC-045	P688-05	GT6S5			Line Filter

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	G. E. PART No.	IRC PART No.	CLAROSTAT PART No.	
R1A	500KΩ	½	RRC-100		AM-60-Z	Volume control
B	Shaft		Not Req.		KSS-3 *	Attach to R1A per instructions
C	Switch		Not Req.		SW-A	Attach to R1A per instructions

* Wrap scotch tape around shaft adjacent to guide disc, for drive cord surface.

RESISTORS

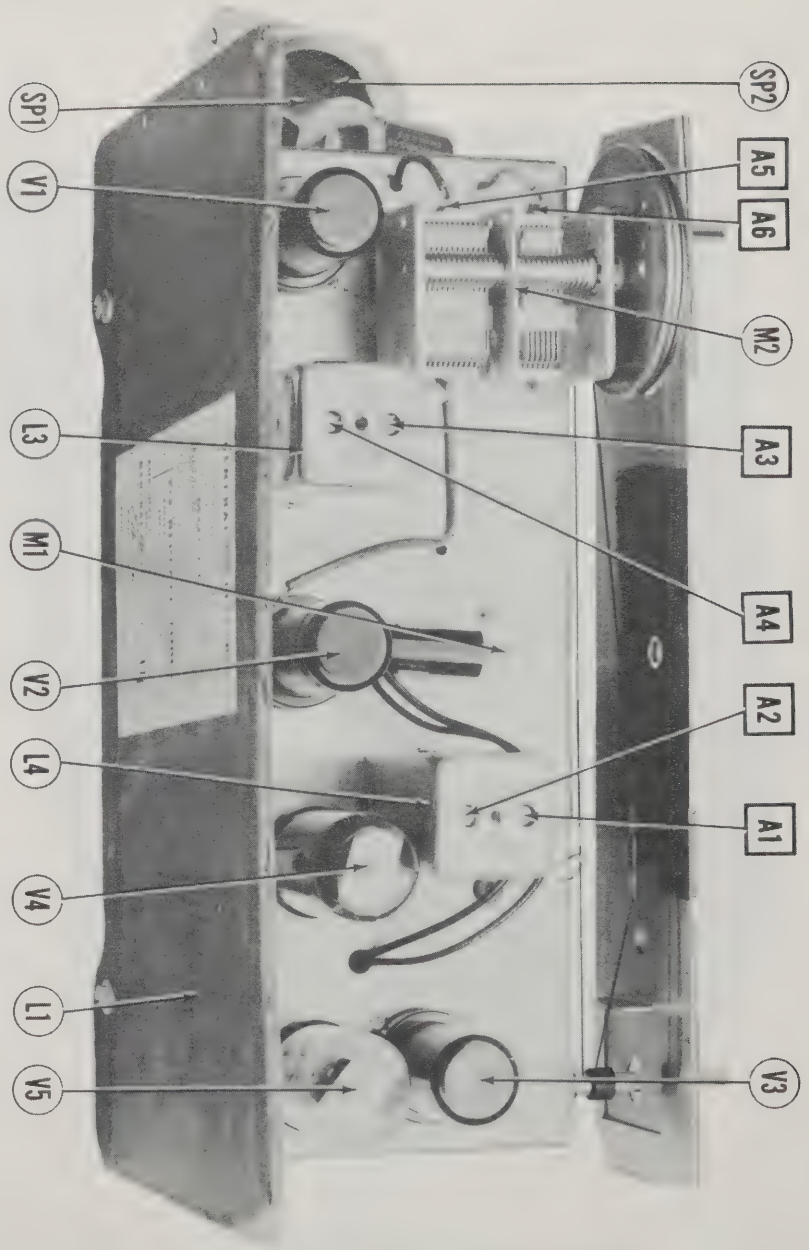
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	G. E. PART No.	IRC PART No.	
R2	22KΩ	½	URD-081	BTS-22K	Osc. Grid
R3	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	AVC Network
R4	4.7 Meg.	½	URD-137	BTS-4.7 Meg.	AF Grid
R5	470KΩ	½	URD-113	BTS-470K	AF Plate
R6	470KΩ	½	URD-113	BTS-470K	Output Grid
R7	100Ω	½		BW-½-100	Output Cathode See Note
R8	2200Ω	2	URF-057	BW-2-2200	Filter
R9	470KΩ	½	URD-113	BTS-470K	Isolation
R10	22Ω	½	URD-009		Surge Limiter

Note. Some models use 150Ω resistor in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		G. E. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	2.8KΩ	3.6Ω	260Ω	.5Ω	RTO-063	A-3332	A-3025	RO-2	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GENERAL ELECTRIC PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-113		
SP1	PM	3.6Ω	UOP-487	MOD. P4-X	4A07	
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

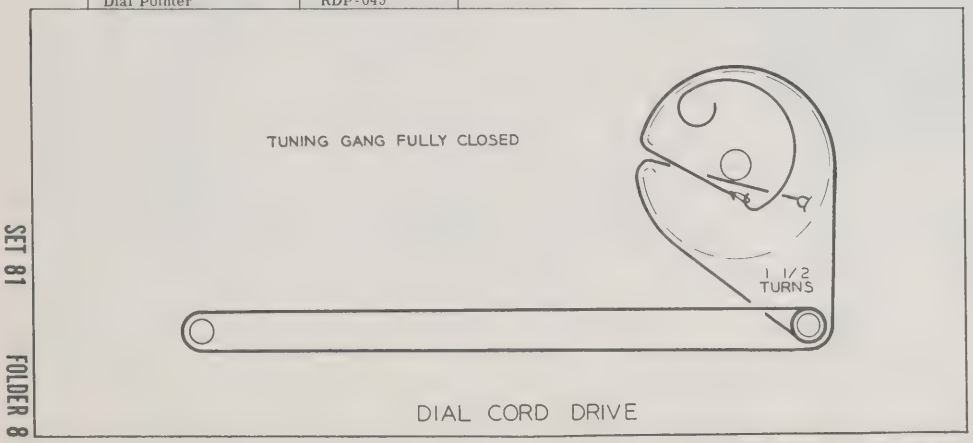
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: G. E. PART No.	REPLACEMENT DATA: MEISSNER PART No.	
L1	Loop Ant.	2.8Ω		RAB-070		Includes cabinet back.
L2	Osc. Coil	.5Ω	7Ω	RLC-090	14-1060	
L3	Input IF	11Ω	11Ω	RTL-092		
L4	Output IF	23Ω	23Ω	RTL-093		

DIAL LIGHTS

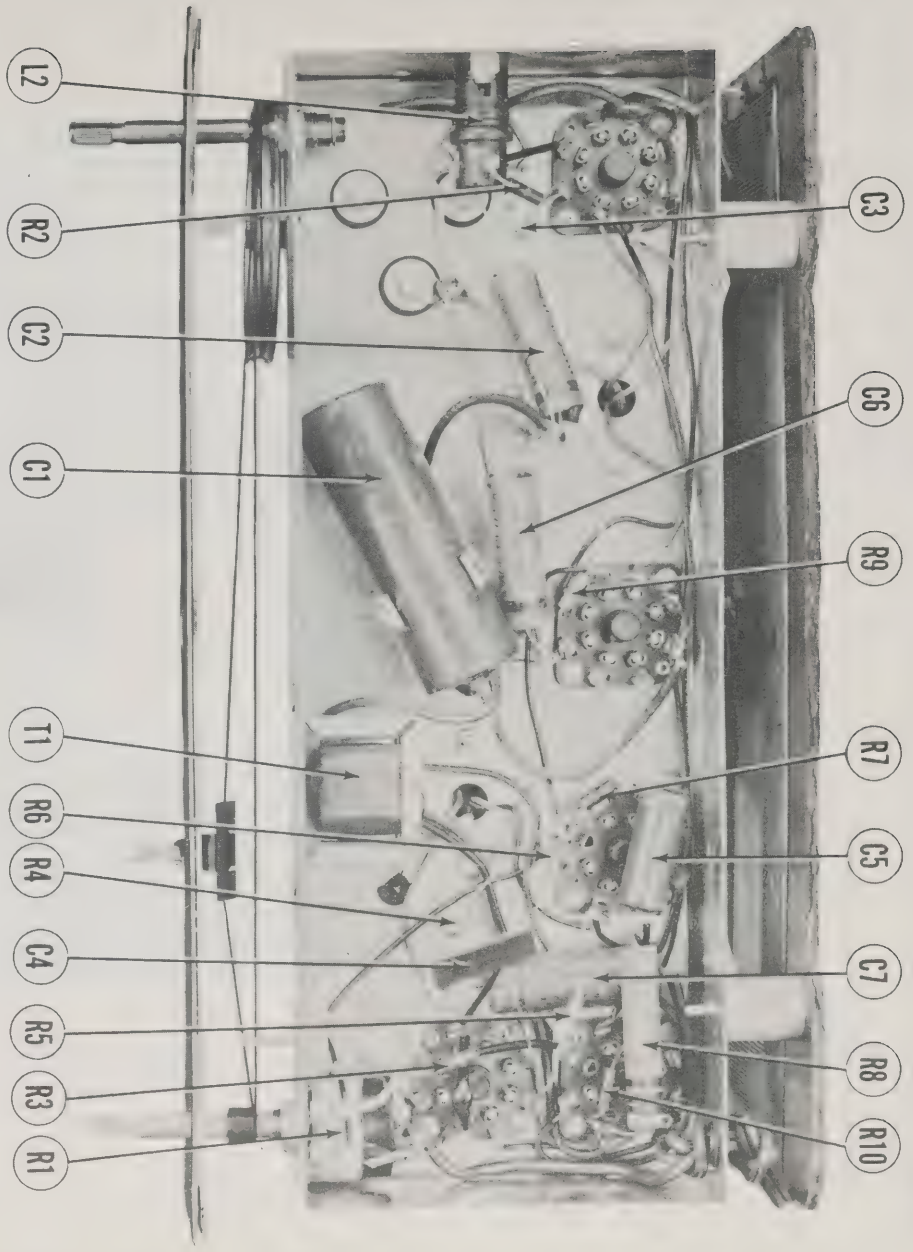
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GENERAL ELECTRIC PART No.		NOTES
M1	Bayonet	6-8	.15	Brown			Type #47

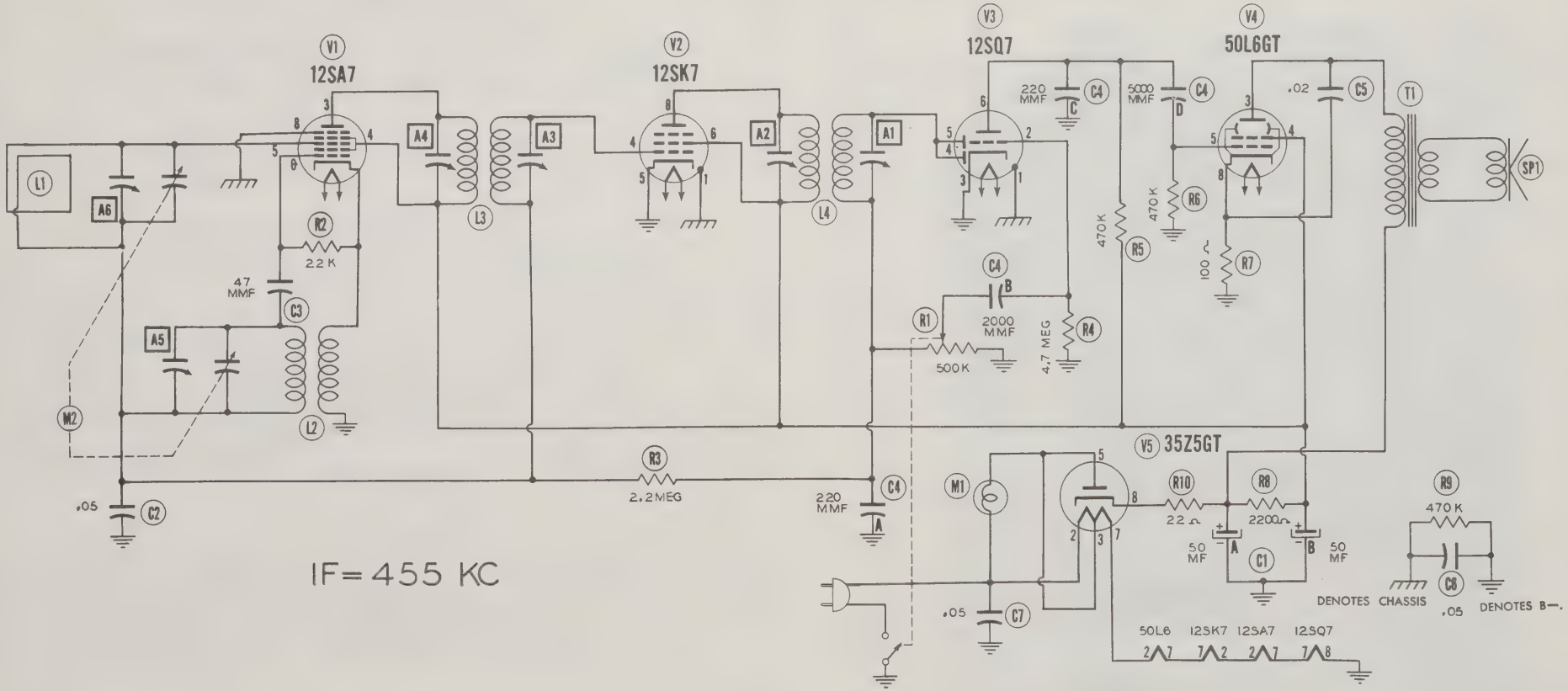
MISCELLANEOUS

ITEM No.	PART NAME	GENERAL ELECTRIC PART No.	NOTES
M2	2 Gang Var. Cap.	RCT-036	(26-498MMF, 19-190MMF)
	Cabinet	RAU-302	Model 135 (Brown)
	Cabinet	RAU-303	Model 136 (Ivory)
	Knob	RDK-020	Model 136
	Knob	RDK-031	Model 135
	Dial Pointer	RDP-045	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	0V.	24VAC	75VDC	75VDC	§-6.2VDC	0V.	12VAC	-.6VDC
V 2	12SK7	0V.	24VAC	0V.	0V.	0V.	75VDC	36VAC	75VDC
V 3	12SQ7	0V.	-.5VDC	0V.	0V.	0V.	40VDC	12VAC	0V.
V 4	50L6GT	0V.	85VAC	105VDC	75VDC	0V.	0V.	36VAC	4VDC
V 5	35Z5GT	0V.	117VAC	112VAC	115VAC	112VAC	-.6VDC	85VAC	117VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SA7	INF	24Ω	†2.2KΩ	†2,2KΩ	22KΩ	.5Ω	12Ω	2.7 Meg.
V 2	12SK7	470KΩ	24Ω	0Ω	2.7 Meg.	0Ω	†2.2KΩ	36Ω	†2.2KΩ
V 3	12SQ7	470KΩ	4.7 Meg.	0Ω	500KΩ	500KΩ	†470KΩ	12Ω	0Ω
V 4	50L6GT	INF	85Ω	†290Ω	†22KΩ	470KΩ	0Ω	36Ω	100Ω
V 5	35Z5GT	INF	110Ω	105Ω	60KΩ	105Ω	2.7 Meg.	85Ω	60KΩ

† Measured from pin 8 of V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

*TRADE MARK

GENERAL ELECTRIC MODELS
830 EARLY, 835 EARLY, 840

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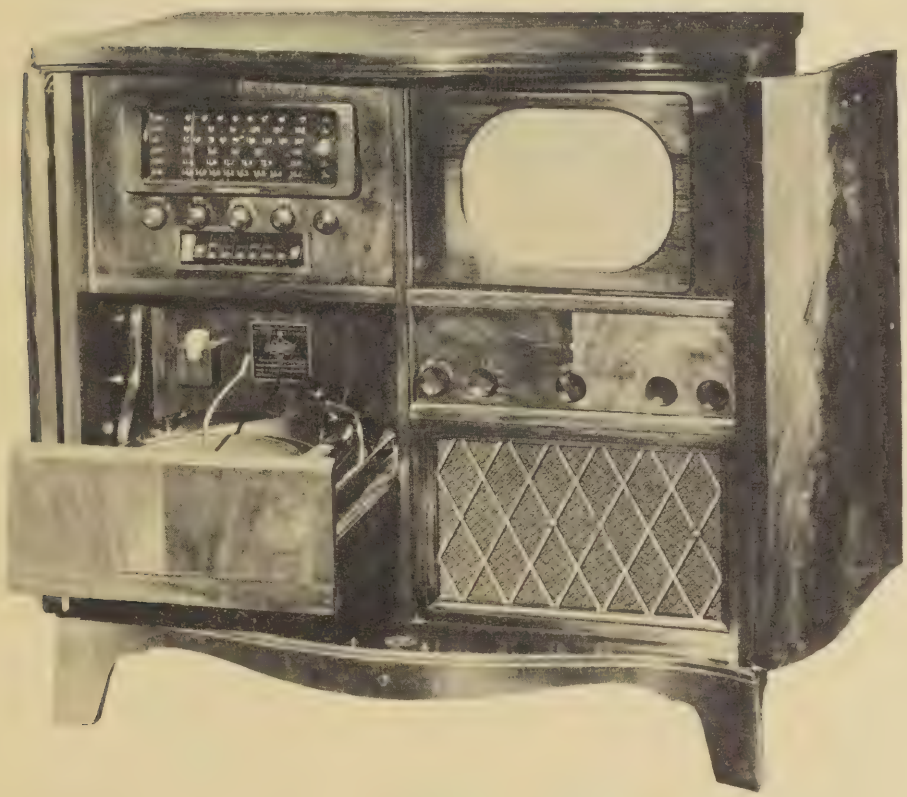

MODEL 840

GENERAL ELECTRIC MODELS
830 EARLY, 835 EARLY, 840

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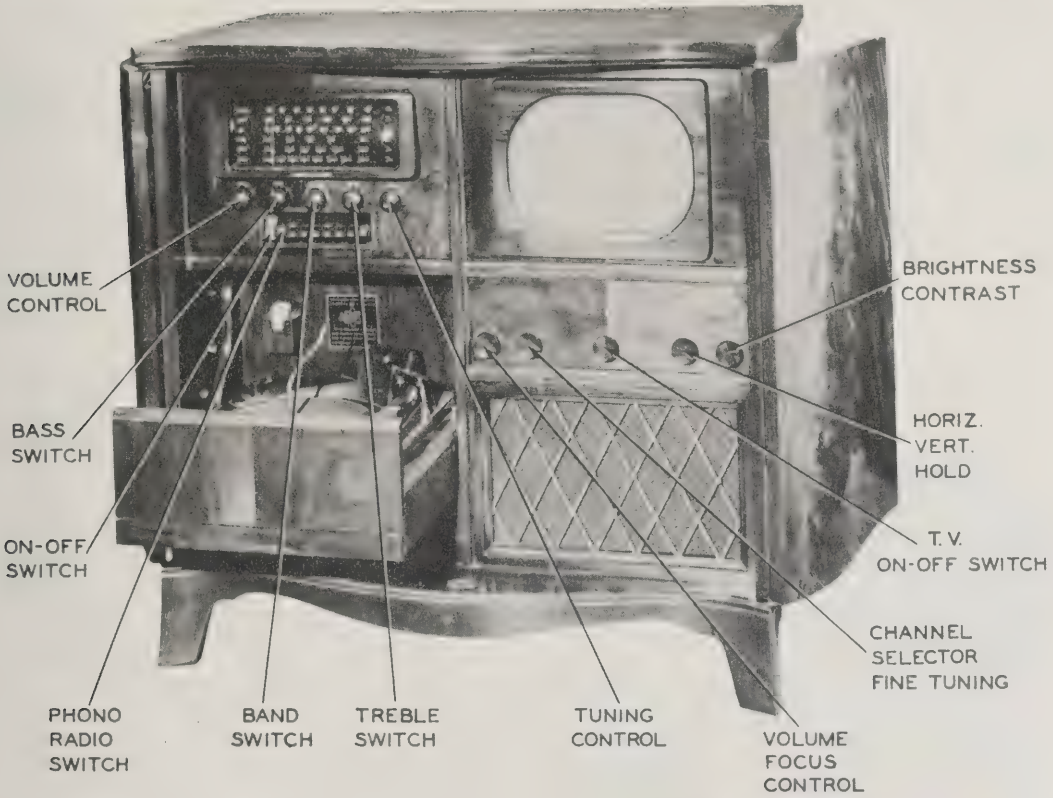
Date 1/50 Set No. 81—Folder No. 9

GENERAL ELECTRIC
MODELS 830 EARLY, 835 EARLY, 840



GENERAL ELECTRIC
MODELS 830 EARLY, 835 EARLY, 840

TRADE NAME	General Electric Models 830 (Early), 835 (Early), 840
MANUFACTURER	General Electric Co., Electronics Dept., Electronic Park, Syracuse, New York
TYPE SET	AM-FM-TV-Phono Receiver (Some Models "TV" only).
TUBES	Thirty Seven (Model 840) Twenty One (Models 830 Early and 835 Early)
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	2.84 Amp. at 117 Volts AC (TV) 1.28 Amp. at 117 Volts AC (Radio)
FREQUENCY RANGE	AM-540-1600KC SW#1 9.4-9.8MC SW#2 11.5-12MC SW#3 14.8-15.5MC FM#1 42-49MC FM#2 88-108MC TV Channels 2 thru 13

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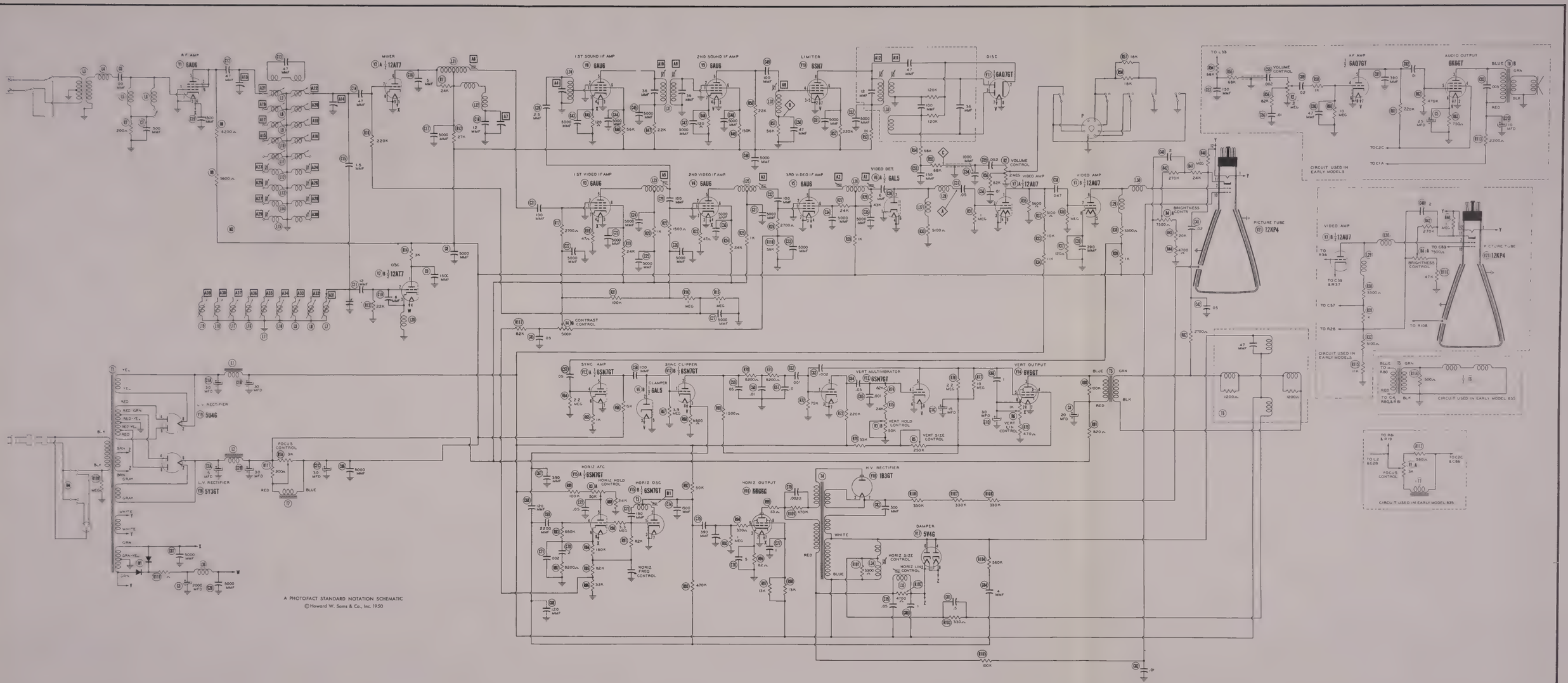
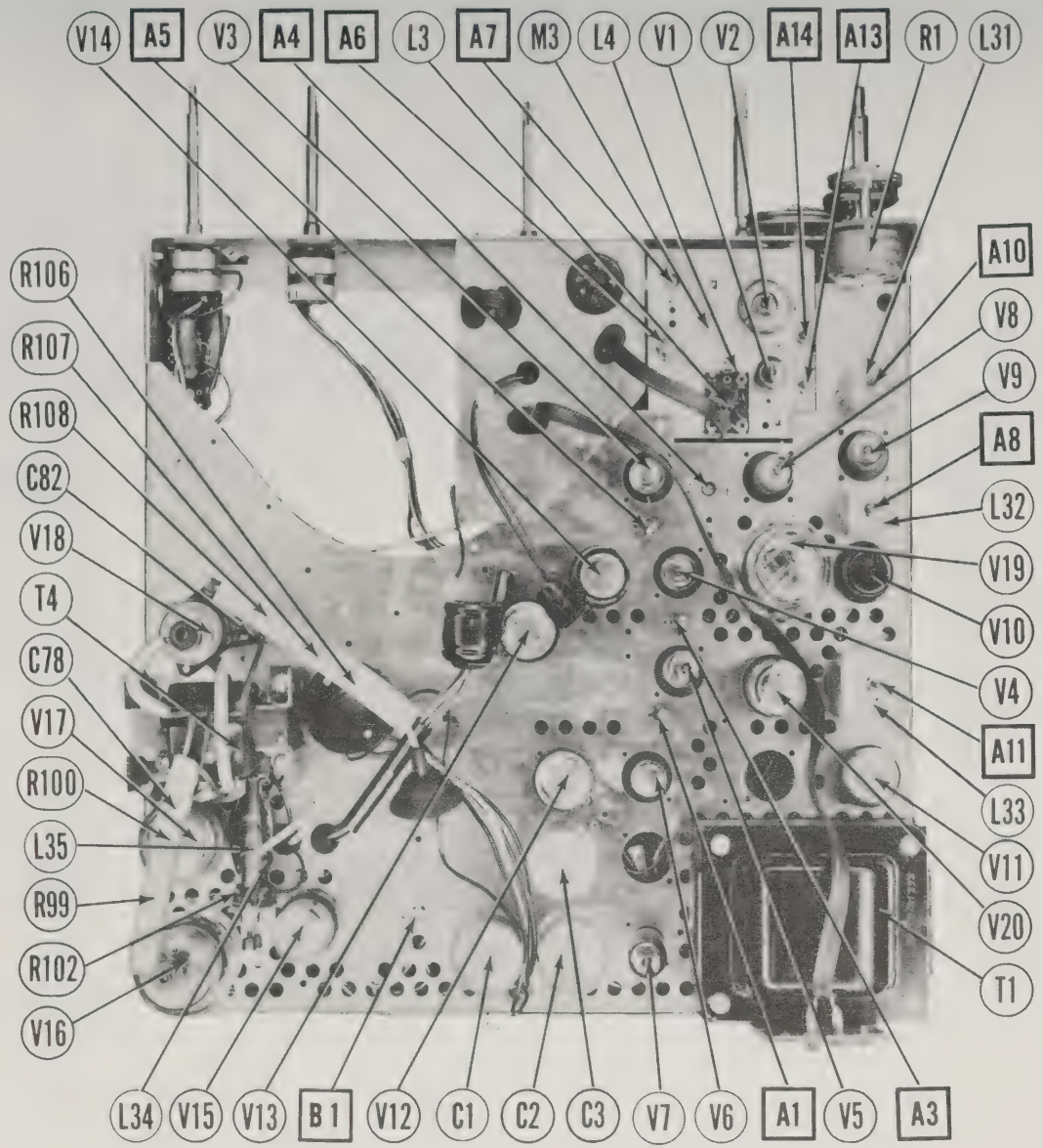
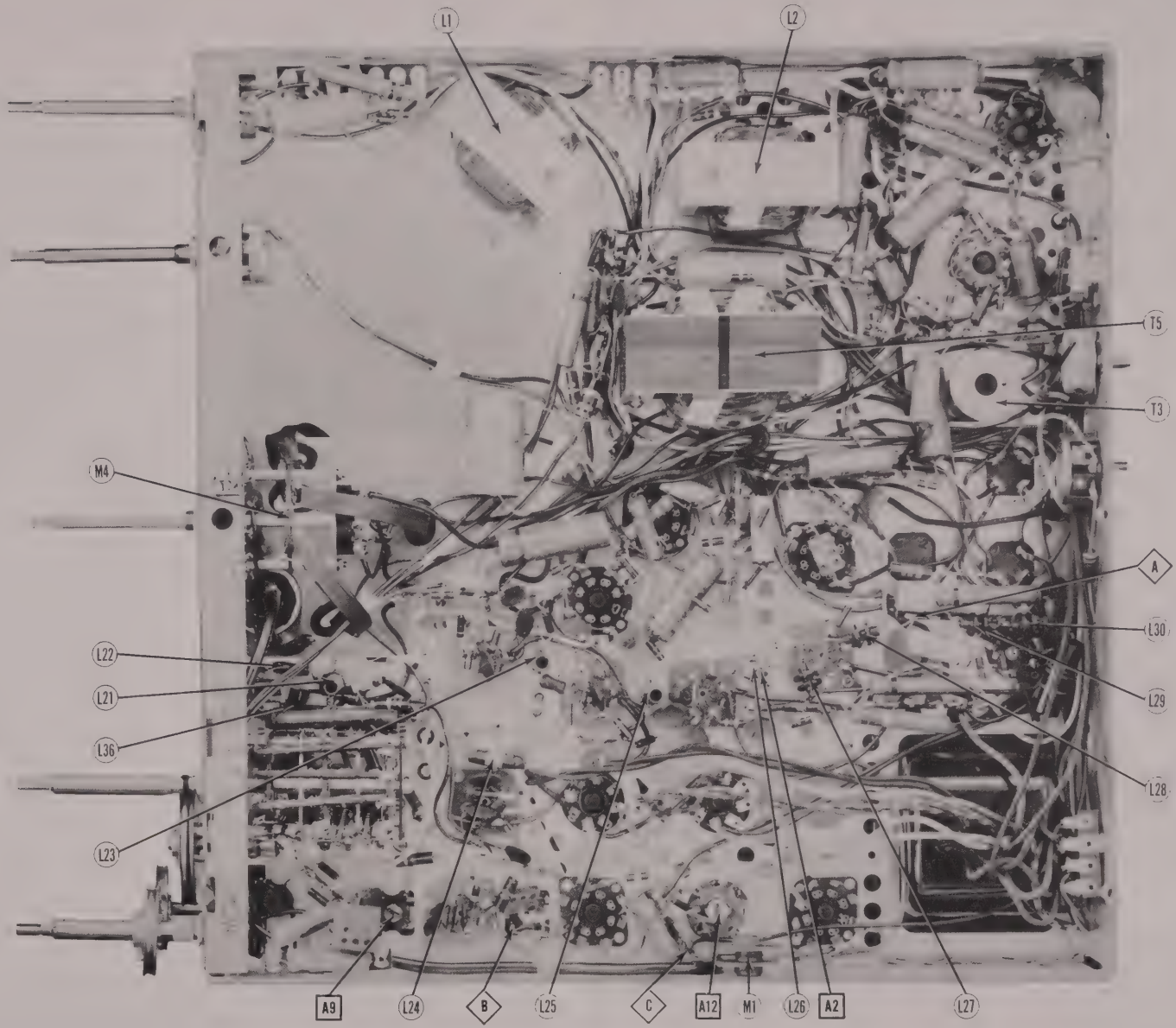


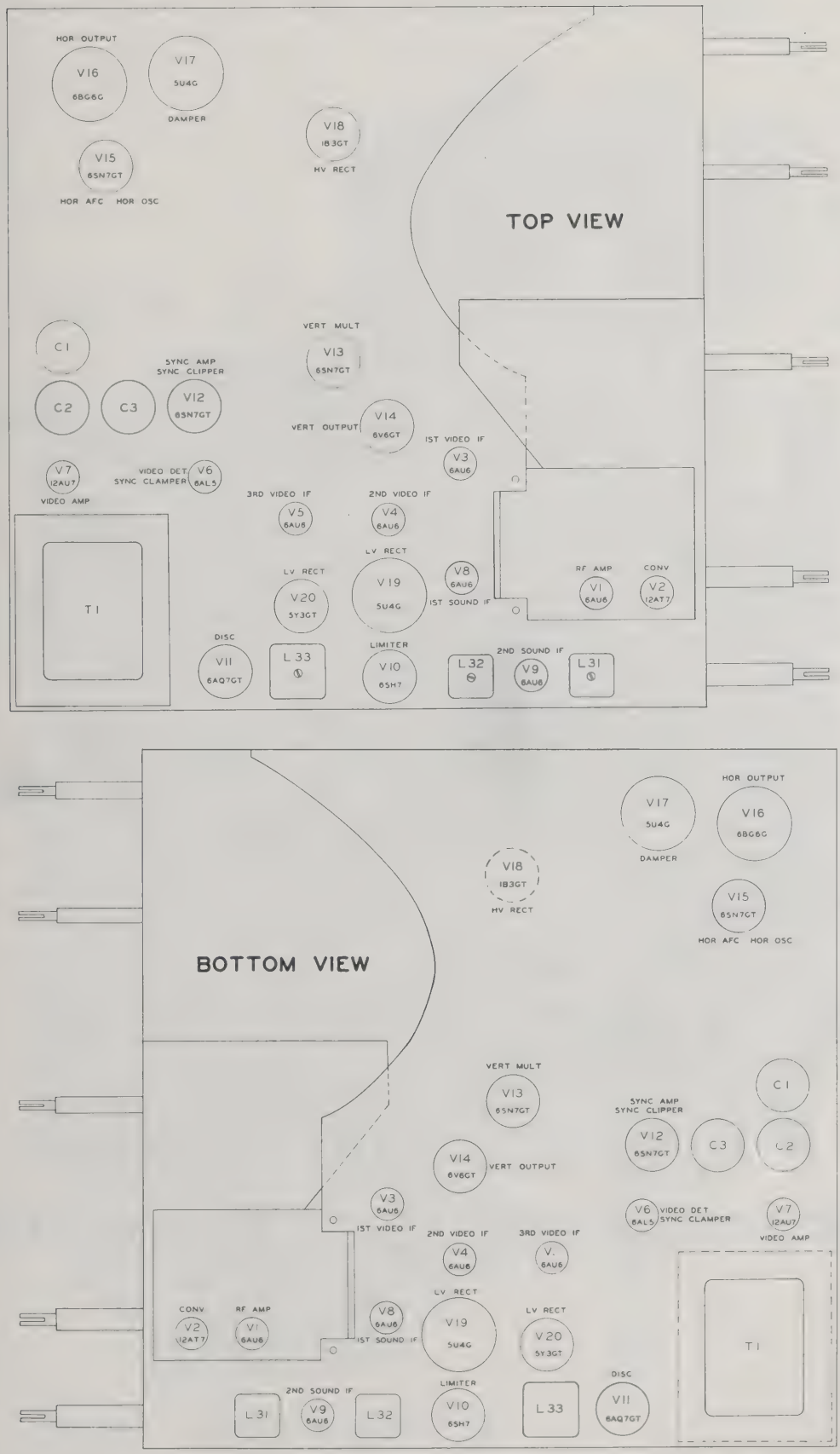
GENERAL ELECTRIC
MODELS 830 EARLY, 835 EARLY, 840



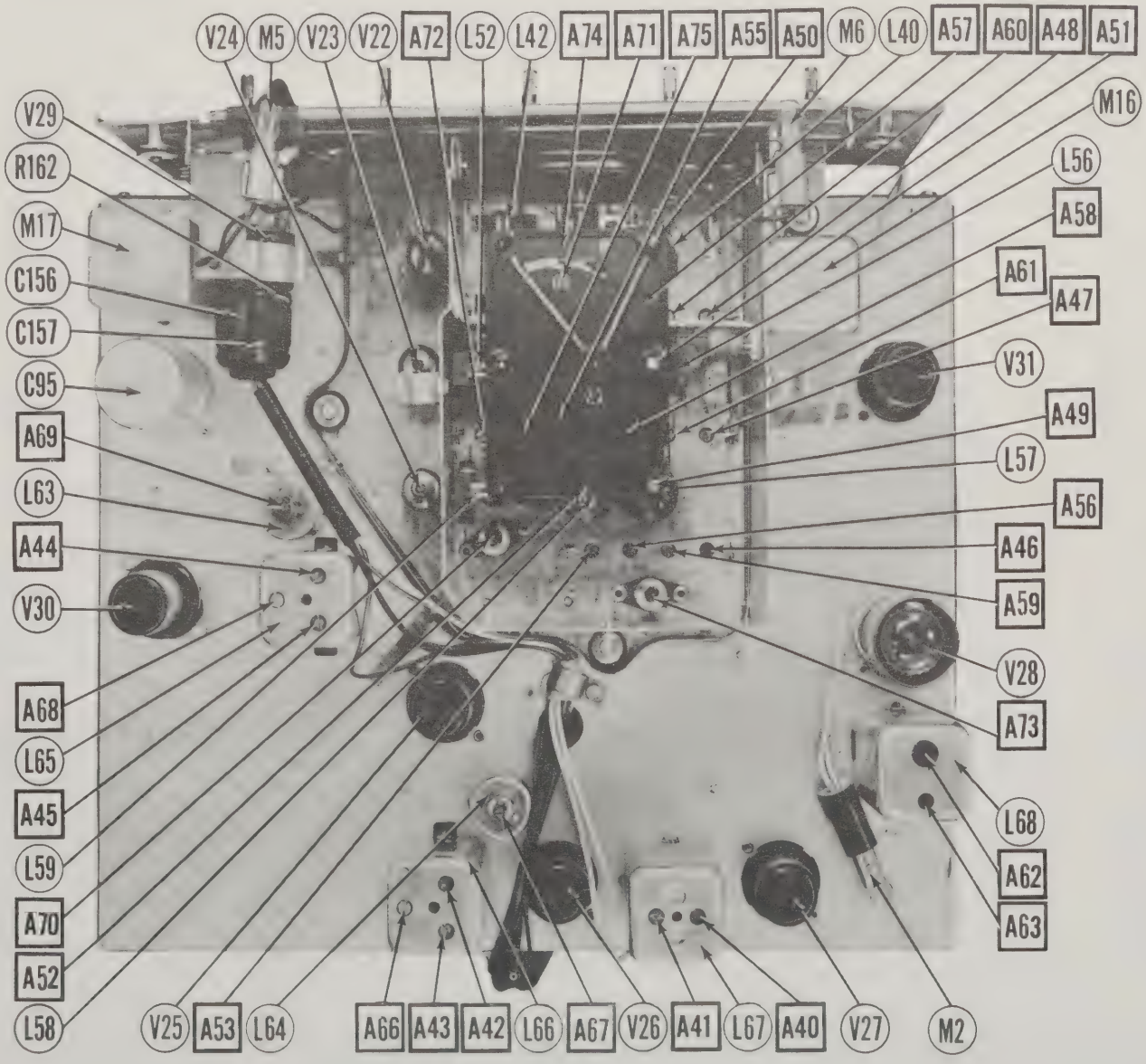
TV CHASSIS TOP VIEW



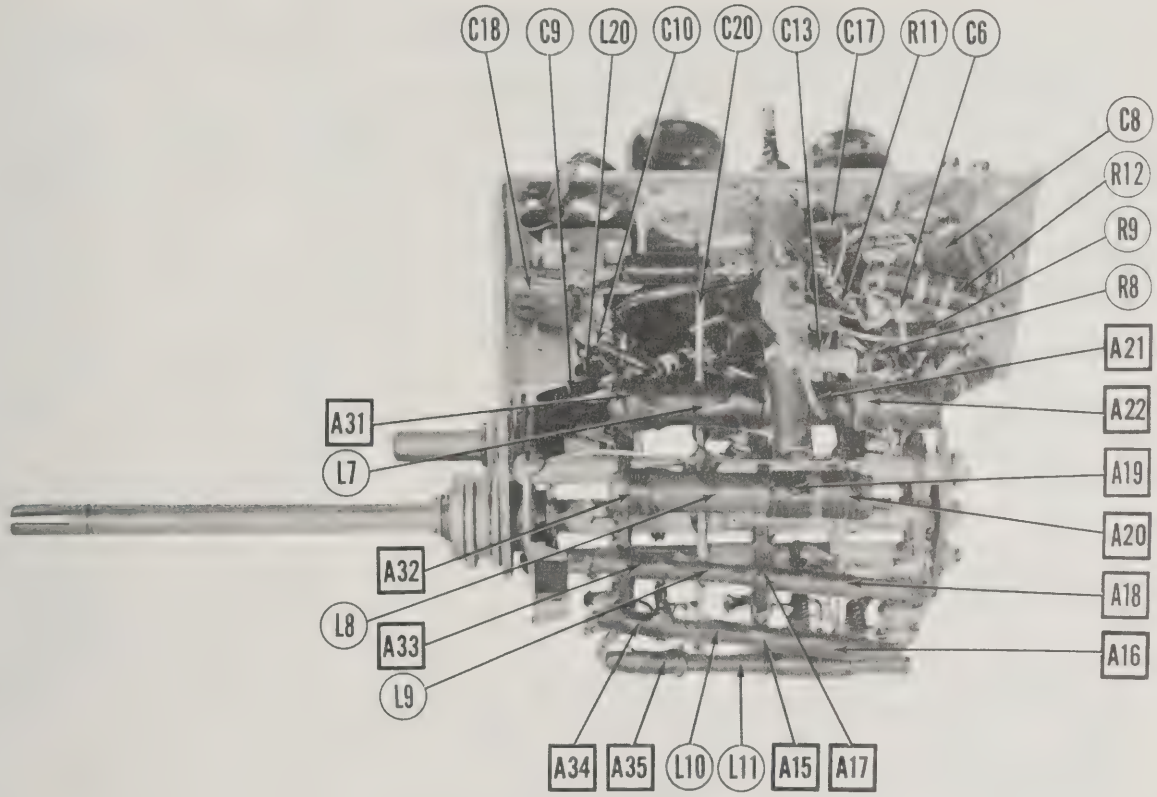
TV CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



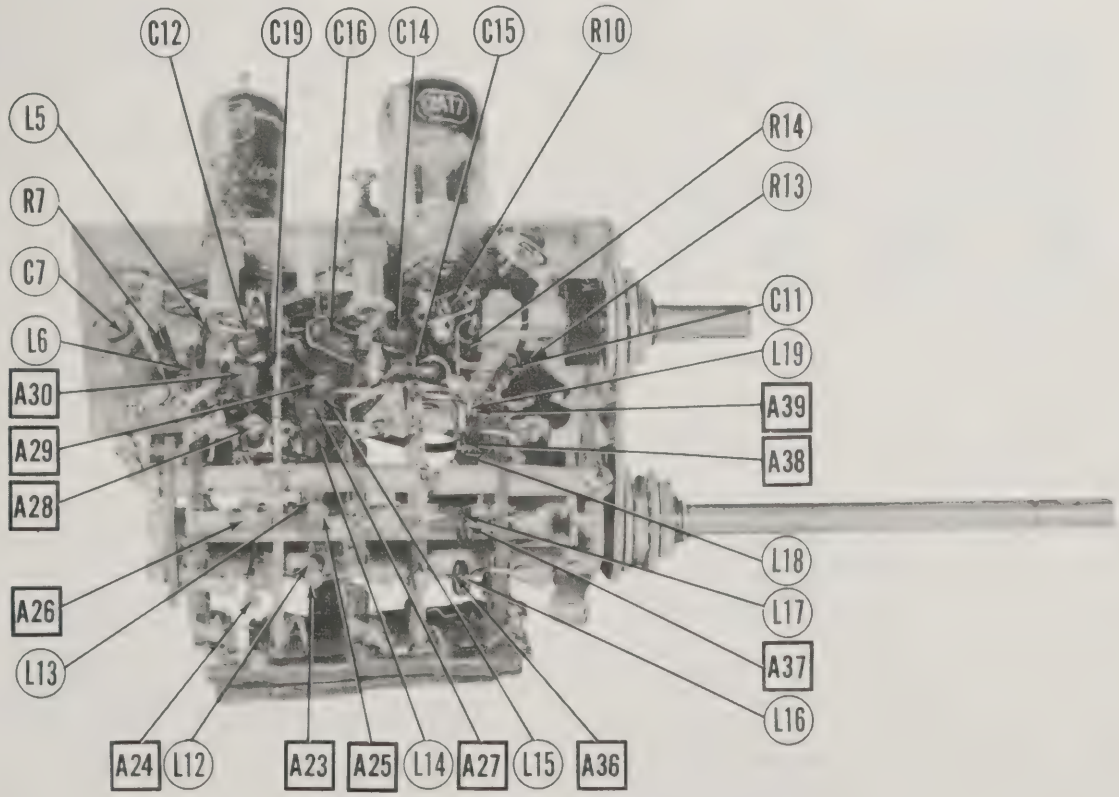
TV TUBE PLACEMENT CHART



RADIO CHASSIS-TOP VIEW



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The end of the high voltage lead should be taped during alignment to eliminate the high voltage shock hazard. Do not remove the horizontal oscillator tube, as it supplies voltage for the contrast control.

Set the contrast control to read -4 volts between the center lug and chassis.

The deflection yoke and focus assembly must be connected to provide proper operating voltages for the receiver.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

Connect a 10KΩ resistor in series with the oscilloscope vertical input lead.

If the response curve is peaked on the low end, and cannot be corrected by the tuning slugs, replace the 6AU6 that the signal is being fed into.

NOTE. Remove the local oscillator tube (V2). Replace it after step 4. Before performing step 5, turn the channel switch to a channel where spurious signals from the local oscillator do not distort the response curve. To check for spurious signal interference, turn the fine tuning control; if the pattern changes switch to another channel.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	500MMF	High side to pin 1 (Grid) of 6AU6 (V5). Low side to chassis.	25MC (10MC Sweep)	22.9MC 26.3MC	Any	Vert. Amp. thru 10KΩ to Point (A) Low side to chassis.	A1, A2	Remove V4. Adjust for response curve similar to Fig 1 with markers as shown.
2.	500MMF	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	"	22.9MC 25.55MC 26.3MC	"	"	A3	Replace V4 and remove V3. Adjust for response curve similar to Fig 1 with markers as shown.
3.	500MMF	High side to pin 1 (Grid) of 6AU6 (V3). Low side to chassis.	"	21.8MC (maximum output)	"	"	A4	Replace V3. Adjust for minimum response at 21.8MC on response curve as shown in Fig 2.
4.	500MMF	"	"	22.9MC 23.4MC 25.55MC 26.3MC	"	"	A5	Adjust for response curve similar to Fig 2 with markers as shown.
5.	Direct	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	"	22.9MC 23.4MC 25.55MC 26.3MC	See note above	"	A6, A7	Turn A6 for minimum capacity. Adjust A7 for response curve similar to Fig 2 with markers as shown. Then adjust A6 to place 26.3MC marker at 50% response as shown in Fig 3. The other markers should be as shown in Fig 3. If necessary retouch A1 thru A7 for proper response.

SOUND IF ALIGNMENT

Use frequency modulated signal with 60 ~ modulation and 450KC sweep. Use 120 ~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	500MMF	High side to pin 1 (Grid) of 6AU6 (V9). Low side to chassis.	21.8MC (1 MC Sweep)	21.8MC	4	Vert. Amp. thru 10KΩ to Point (B) Low side to chassis.	A8	Adjust for maximum amplitude and symmetry as per Fig 4.
7.	500MMF	High side to pin 1 (Grid) of 6AU6 (V8). Low side to chassis.	"	"	"	"	A9, A10	"
8.	500MMF	"	"	"	"	Vert. Amp. to Point (C) Low side to chassis.	A11, A12	Adjust A11 so 21.8MC marker occurs at center of crossover lines as per Fig 5. Adjust A12 for maximum amplitude and straightness of crossover lines.

RF ALIGNMENT

The RF and mixer portions of this receiver are normally very stable. Alignment of the tuner should not be attempted unless definitely known to be out of alignment and then only if suitable test equipment is available.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

Set the contrast control to minimum, (maximum counter-clockwise).

Connect a 200Ω resistor across R11.

Unsolder the grounded end of capacitor C17. Connect the oscilloscope vert. amp. input through 10KΩ to the junction of C17 and R12. This is Point D on the schematic drawing.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Note that channels 8 through 13 are covered by only 3 channel switch positions, each of these 3 positions covers 2 channels.

Adjustments A13 and A14 are used to compensate for differences in capacity when tubes, or other component changes are made.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	85MC (15MC Sweep)	83.25MC 87.75MC	6	Vert. Amp. thru 10KΩ to Point (D) Low side to chassis.	A13, A14	Adjust for response similar to Fig 6 with markers as shown.
10.	"	"	79MC (15MC Sweep)	77.25MC 81.75MC	5	"	A15, A16	Adjust inductance by expanding or compressing end coil turns for response similar to Fig 6 with proper marker placement.
11.	"	"	69MC (15MC Sweep)	67.25MC 71.75MC	4	"	A17, A18	"
12.	"	"	63MC (15MC Sweep)	61.25MC 65.75MC	3	"	A19, A20	"
13.	"	"	57MC (15MC Sweep)	55.25MC 59.75MC	2	"	A21, A22	Adjust inductance by moving copper rings to obtain response similar to Fig 7 with proper marker placement.
14.	"	"	177MC (15MC Sweep)	175.25MC 179.75MC	7	"	A23, A24	Adjust inductance by turning brass screws in coils. Adjust for response curve similar to Fig 6 with proper marker placement.
15.	"	"	186MC (25MC Sweep)	181.25MC 191.75MC	8 and 9	"	A25, A26	Adjust inductance by turning brass screws in coils. Adjust for response similar to Fig 8 with marker placement as shown.
16.	"	"	198MC (25MC Sweep)	193.25MC 203.75MC	10 and 11	"	A27, A28	"
17.	"	"	210MC (25MC Sweep)	205.25MC 215.75MC	12 and 13	"	A29, A30	"

TV ALIGNMENT INSTRUCTIONS (CONT.)

OSCILLATOR ALIGNMENT

Resolder the ground lead of C17.
Set the fine tuning control to mid-position.
On channels 8 through 13, the oscillator is tuned mid way between the two channels covered by each channel switch position. This allows the two channels to be tuned in with the fine tuning control set an equal distance either side of the mid position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
18.	Two 120Ω carbon res.	Across antenna terminal with 120Ω in each lead.	59.75MC (Unmod.)	2	DC Probe to Point ◇ Common to chassis.	A31	Adjust inductance by expanding or compressing coil turns. Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
19.	"	"	65.75MC (Unmod.)	3	"	A32	Check all other channels to see that zero reading occurs with the fine tuning control near mid-position. On any channel that this condition does not exist, expand or compress the oscillator coil turns for zero reading as obtained in step 18. Note that on channels 8 thru 12 between the two channels covered by each channel switch position.
			71.75MC (Unmod.)	4		A33	
			81.75MC (Unmod.)	5		A34	
			87.75MC (Unmod.)	6		A35	
			179.75MC (Unmod.)	7		A36	
			188.75MC (Unmod.)	8 and 9		A37	
			200.75MC (Unmod.)	10 and 11		A38	
			212.75MC (Unmod.)	12 and 13		A39	

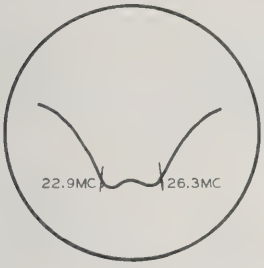


FIG. 1

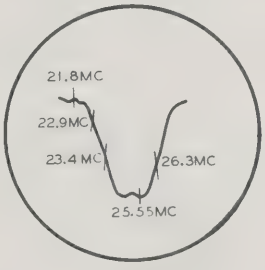


FIG. 2

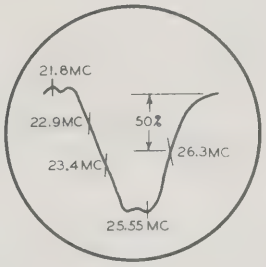


FIG. 3

FIG. 4

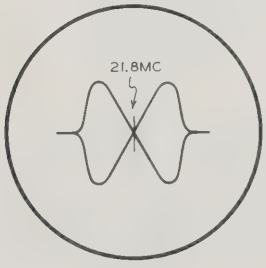


FIG. 5

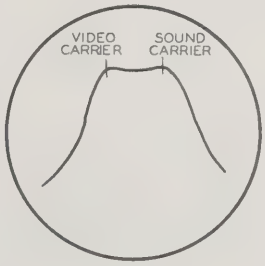


FIG. 6

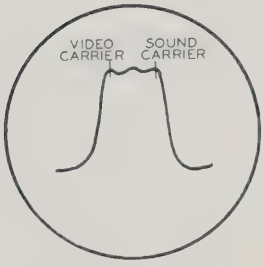


FIG. 7

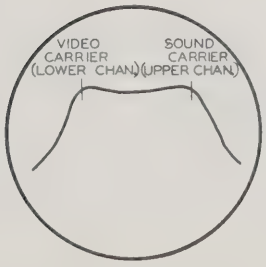


FIG. 8

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The receiver will not operate without all of the cables properly connected.
Turn the TV off-on switch to off (counter-clockwise).
To set dial pointer, turn the tuning gang fully open and set the right hand edge of the pointer carriage to the zero on the calibration scale on the rear of the dial back plate.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
20	Direct	High side to pin (Grid) of 6AK5 (V22). Low side to chassis.	455KC (400 ~ Mod.)	STD BC (third position clock-wise)	Turn pointer to right hand stop.	Across voice coil	A40, A41, A42, A43, A44, A45	Adjust for maximum output.
21	200MMF	High side to AM antenna terminal. Low side to chassis.	1620KC (400 ~ Mod.)	"	"	"	A46, A47, A48	Adjust for maximum output.
22	200MMF	"	1500KC (400 ~ Mod.)	"	Set right hand edge of pointer carriage to 30 on the scale on rear of dial backplate.	"	A49	Adjust for maximum output.
23	200MMF	"	1000KC (400 ~ Mod.)	"	Tune for max. output.	"	A50, A51	Adjust for maximum output.
24	200MMF	"	580KC	"	"	"	A52	Rock tuning while adjusting A52 for maximum output. Repeat steps 21 thru 24 until no further improvement can be made.
25	400Ω carbon res.	High side thru 400 ~ to AM ant. terminal. Low side to chassis.	15.2MC (400 ~ Mod.)	SW 3 (max. clock-wise)	Set right hand edge of pointer carriage to 101 on the scale on rear of dial backplate.	"	A53, A54	Adjust for maximum output.
26	"	"	"	"	"	"	A55	Rock tuner while adjusting A55 for maximum output.
27	"	"	11.8MC (400 ~ Mod.)	SW 2 (second position CCW)	Set right hand edge of pointer carriage to 90 on the scale on rear of dial backplate.	"	A56, A57	Adjust for maximum output.
28	"	"	"	"	"	"	A58	Rock tuner while adjusting A58 for maximum output.
29	"	"	9.6MC (400 ~ Mod.)	SW 1 (third position CCW)	Set right hand end of pointer carriage to 110 on the scale on rear of dial backplate.	"	A59, A60	Adjust for maximum output.
30	"	"	"	"	"	"	A61	Rock tuner while adjusting A61 for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect the VTVM DC Probe thru 200KΩ for steps 33, 34 and 35.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
31	.01MFD	High side to pin 2 (Grid) of 6SV7 (V26). Low side to chassis.	10.7MC (Unmod.)	FM 1 (max. CCW)	Turn pointer to the stop on right hand end of dial.	DC Probe to Point◇D◇ Common to chassis.	A62	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
32	.01MFD	"	Adjust for max. reading.	"	"	"	A63	Detune signal generator to point of maximum reading. Adjust A63 for maximum deflection.
33	.01MFD	High side to pin 2 (Grid) of 6SV7 (V25). Low side to chassis.	10.7MC (Unmod.)	"	"	DC Probe thru 200KΩ to Point ◇E◇ Common to chassis.	A64, A65	Remove V27. Adjust for maximum deflection.
34	.01MFD	High side to pin 4 (Grid) of 6SG7 (V24). Low side to chassis.	"	"	"	"	A66, A67	Adjust for maximum deflection.
35	.01MFD	High side to ungrounded tube shield floating over mixer tube (V22).	"	"	"	"	A68, A69	Adjust for maximum deflection. Replace V27.

RADIO ALIGNMENT INSTRUCTIONS (CONT.)

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ~ modulation and 450KC sweep. Use 120 ~ sawtooth voltage in scope for horizontal deflection. Connect the oscilloscope vert. amp. input lead thru 200KΩ for steps 31, 32 and 33.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
31	.01MFD	High side to pin 2 of (Grid) of 6SV7 (V25). Low side to chassis.	10.7MC (450KC Sweep)	FM 2 (second position CW)	Point of non interference	Vert. Amp. thru 200KΩ to Point (E) Low side to chassis.	A64, A65	Remove V27. Adjust for maximum amplitude and symmetry as per Fig 9.
32	.01MFD	High side to pin 4 (Grid) of 6SG7 (V24). Low side to chassis.	"	"	"	"	A66, A67	"
33	Direct	High side to pin 1 (Grid) of 6AK5 (V22). Low side to chassis.	"	"	"	"	A68, A69	"
34	Direct	"	"	"	"	Vert. Amp. to Point (D) Low side to chassis.	A62, A63	Replace V27. Adjust A62 so 10.7MC occurs at center of crossover lines as per Fig 10. Adjust A63 for maximum amplitude and straightness of crossover lines. Continue with step 36.

FM RF ALIGNMENT

Connect the VTVM DC Probe thru 200KΩ to Point E.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
36	300Ω carbon res.	High side thru 300Ω to ungrounded FM dipole antenna terminal.	98MC (Unmod.)	FM 1 (max. CCW)	Set right hand edge of pointer carriage to 97 on the scale on back of dial backplate.	DC Probe thru 200KΩ to Point (E) Low side to chassis.	A70, A71	Adjust for maximum deflection.
37	"	"	"	"	Tune for max. deflection.	"	A72	Rock tuner while adjusting A72 for maximum deflection.
38	"	"	46MC (Unmod.)	FM 2 (second position CW)	Set right hand edge of pointer carriage to 88 on the scale on rear of dial backplate.	"	A73, A74	Adjust for maximum deflection.
39	"	"	"	"	Tune for max. deflection.	"	A75	Rock tuner while adjusting A75 for maximum deflection.

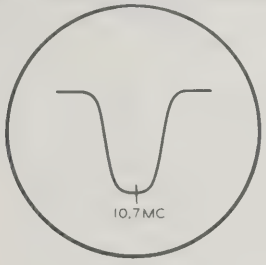


FIG. 9

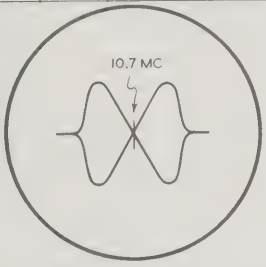


FIG. 10

PUSHBUTTON ADJUSTMENTS

The band switch must be in the standard broadcast position for pushbutton operation. Each pushbutton can be tuned over a portion of the broadcast band. The first three buttons to the right of the on-off switch each tune from 540 to 1050KC. The fourth and fifth buttons to the right of the phono switch each tune from 850 to 1520KC. The remaining button covers from 1000 to 1600KC.

A. Make up a list of the stations that are to be tuned by the pushbuttons, making sure each station is within the range of the indiviual pushbuttons.

B. Depress the dial button; and manually tune in the station to be received by the first pushbutton.

C. Depress the first pushbutton; then pull the pushbutton upward and outward as far as it will go. Do not force.

D. Adjust the slug (B2) until the station selected is heard. Then adjust the trimmer (B3) for maximum volume and clarity. If the slug will not tune the coil to the frequency of the desired station, slighty loosen or tighten the trimmer and readjust the slug until the desired station is heard.

E. Check the setting of the pushbutton by depressing the dial button and carefully tuning in the station manually. Depress the pushbutton. If there is any change in volume, readjust B2 and B3. Repeat step "E" until there is no volume change.

Continue this procedure for the remaining pushbuttons.

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0V.	140VDC	0V.	6.3VAC	140VDC	140VDC	1.5VDC		
V 2	12AT7	205VDC	§-1.5VDC	0V.	6VDC	6.3VAC	160VDC	-3.9VDC	0V.	0V.
V 3	6AU6	-3.8VDC	0V.	0V.	6.3VAC	250VDC	180VDC	.6VDC		
V 4	6AU6	-1VDC	0V.	0V.	6.3VAC	250VDC	185VDC	.6VDC		
V 5	6AU6	-1VDC	0V.	0V.	6.3VAC	210VDC	145VDC	0V.		
V 6	6AL5	0V.	-.4VDC	6.3VAC	0V.	0V.	0V.	-.8VDC		
V 7	12AU7	42VDC	-.3VDC	0V.	0V.	0V.	155VDC	0V.	1.7VDC	6.3VAC
V 8	6AU6	0V.	0V.	0V.	6.3VAC	110VDC	110VDC	.8VDC		
V 9	6AU6	0V.	0V.	0V.	6.3VAC	157VDC	65VDC	.5VDC		
V 10	6SH7	0V.	0V.	0V.	-.3VDC	0V.	45VDC	6.3VAC	217VDC	
V 11	6AQ7GT	0V.	.3VDC	-1.5VDC	0V.	0V.	0V.	6.3VAC	0V.	
V 12	6SN7GT	-.4VDC	75VDC 157VDC	3VDC	0V.	155VDC 2.7VDC	4.2VDC 6.2VDC	0V.	6.3VAC	
V 13	6SN7GT	-.2VDC	25VDC	0V.	-2.5VDC	2.7VDC 6.2VDC	0V.	0V.	6.3VAC	
V 14	6V6GT	0V.	6.3VAC	250VDC	75VDC 157VDC	2.5VDC 6.2VDC	1.1VDC	0V.	0.4VDC 10VDC	
V 15	6SN7GT	-65VDC	195VDC	0V.	-35VDC	45VDC	-25VDC	0V.	6.3VAC	
V 16	6BG6G	0V.	0V.	8VDC	-4.2VDC	-4.2VDC	0V.	6.3VAC	270VDC	TOP CAP *
V 17	5V4G	0V.	400VDC	0V.	325VDC	0V.	325VDC	0V.	400VDC	
V 18	1B3GT	* DO NOT MEASURE								
V 19	5U4G	0V.	345VDC	0V.	335VAC	0V.	335VAC	0V.	345VDC	
V 20	5Y3GT	0V.	270VDC	0V.	290VAC	0V.	290VAC	0V.	270VDC	
V 21	12KP4	##	185VDC	PIN 10 425VDC	PIN 11 225VDC	PIN 12 ##				
V 22	6AG5	-1.8VDC	0V.	0V.	6.3VAC	250VDC	105VDC	0V.		
V 23	6AK5	-.5VDC	0V.	0V.	6.3VAC	250VDC	250VDC	0V.		
V24A	6AK5	§-3VDC	0V.	0V.	6.3VAC	120VDC	120VDC	0V.		
‡ B	6AK5	§-1.9VDC	0V.	0V.	6.3VAC	140VDC	140VDC	0V.		
V25	6BG7	0V.	0V.	2.2VDC	0V.	2.2VDC	130VDC	6.3VAC	245VDC	
V26	6SV7	0V.	0V.	2.2VDC	150VDC	0V.	245VDC	0V.	6.3VAC	
V27A	6SV7	0V.	-.5VDC	0V.	0V.	-.5VDC	150VDC	0V.	6.3VAC	
‡ B	6SV7	0V.	-.3VDC	0V.	60VDC	-.6VDC	100VDC	0V.	6.3VAC	
‡V23	6AQ7GT	.4VDC	.4VDC	0V.	.3VDC	145VDC	35VDC	0V.	6.3VAC	
V29	6AL7GT	0V.	0V.	290VDC	-.1VDC	-.1VDC	-.1VDC	6.3VAC	1.1VDC	
♦V30	6SC7	0V.	70VDC	-.3VDC	-.3VDC	65VDC	0V.	##	##	
V31	6SQ7	0V.	-.3VDC	0V.	0V.	0V.	110VDC	0V.	6.3VAC	
V32	6SN7GT	30VDC	200VDC	70VDC	0V.	120VDC	4.3VDC	##	##	
V33	6V6GT	0V.	##	290VDC	290VDC	0V.	0V.	##	18VDC	
V34	6V6GT	0V.	##	290VDC	290VDC	0V.	0V.	##	18VDC	
V35	6V6GT	0V.	##	290VDC	290VDC	0V.	0V.	##	18VDC	
V36	6V6GT	0V.	##	290VDC	290VDC	0V.	0V.	##	18VDC	
V37	5U4G	0V.	310VDC	0V.	315VAC	0V.	315VAC	0V.	310VDC	

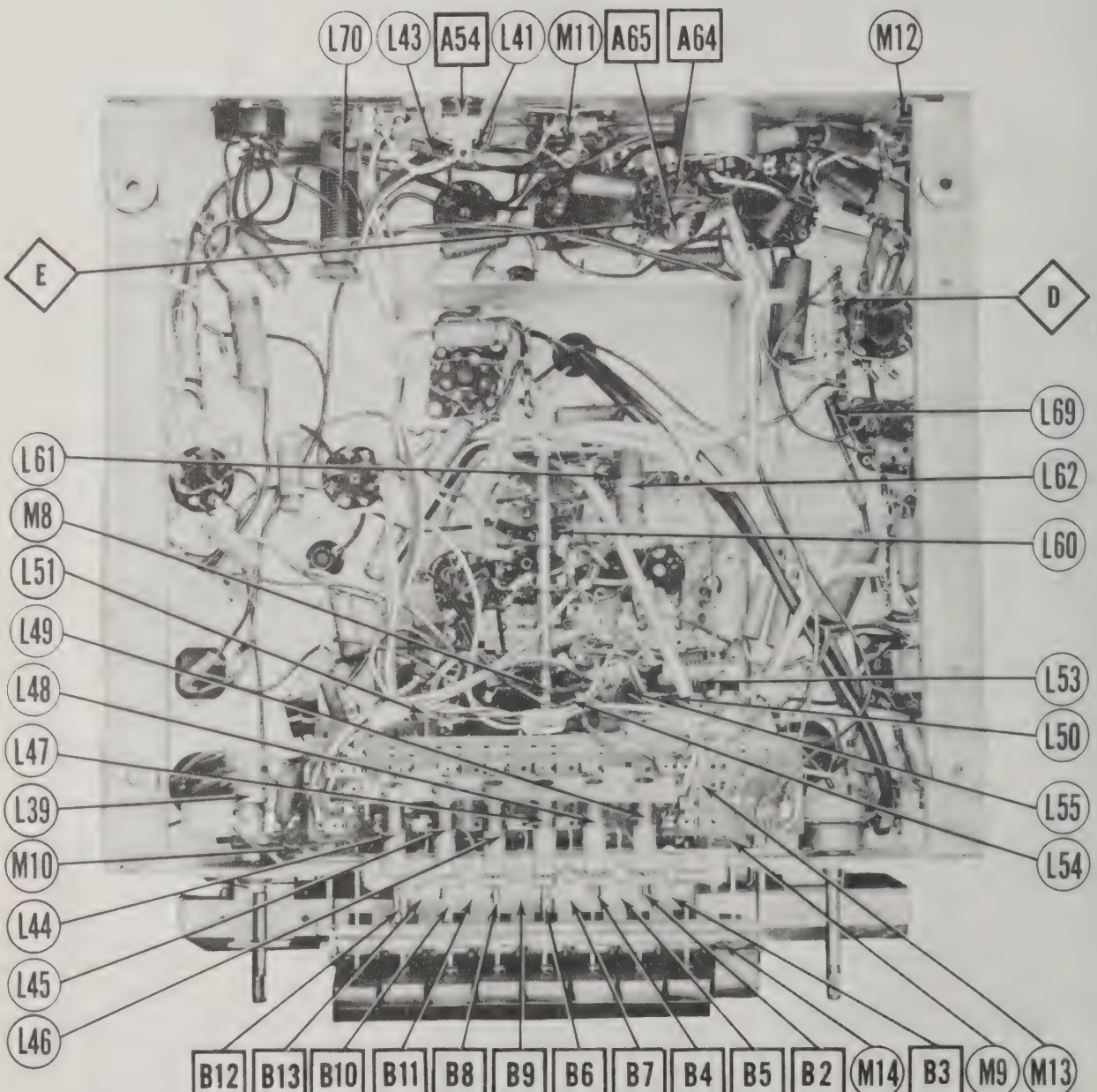
§ Taken with vacuum tube voltmeter.
‡ Taken in FM position.
* Do not measure.
♦ Measured in "Phono" position.
6.3VAC measured across filaments.
NOTE: Contrast control set at maximum for these readings.

RESISTANCE READINGS

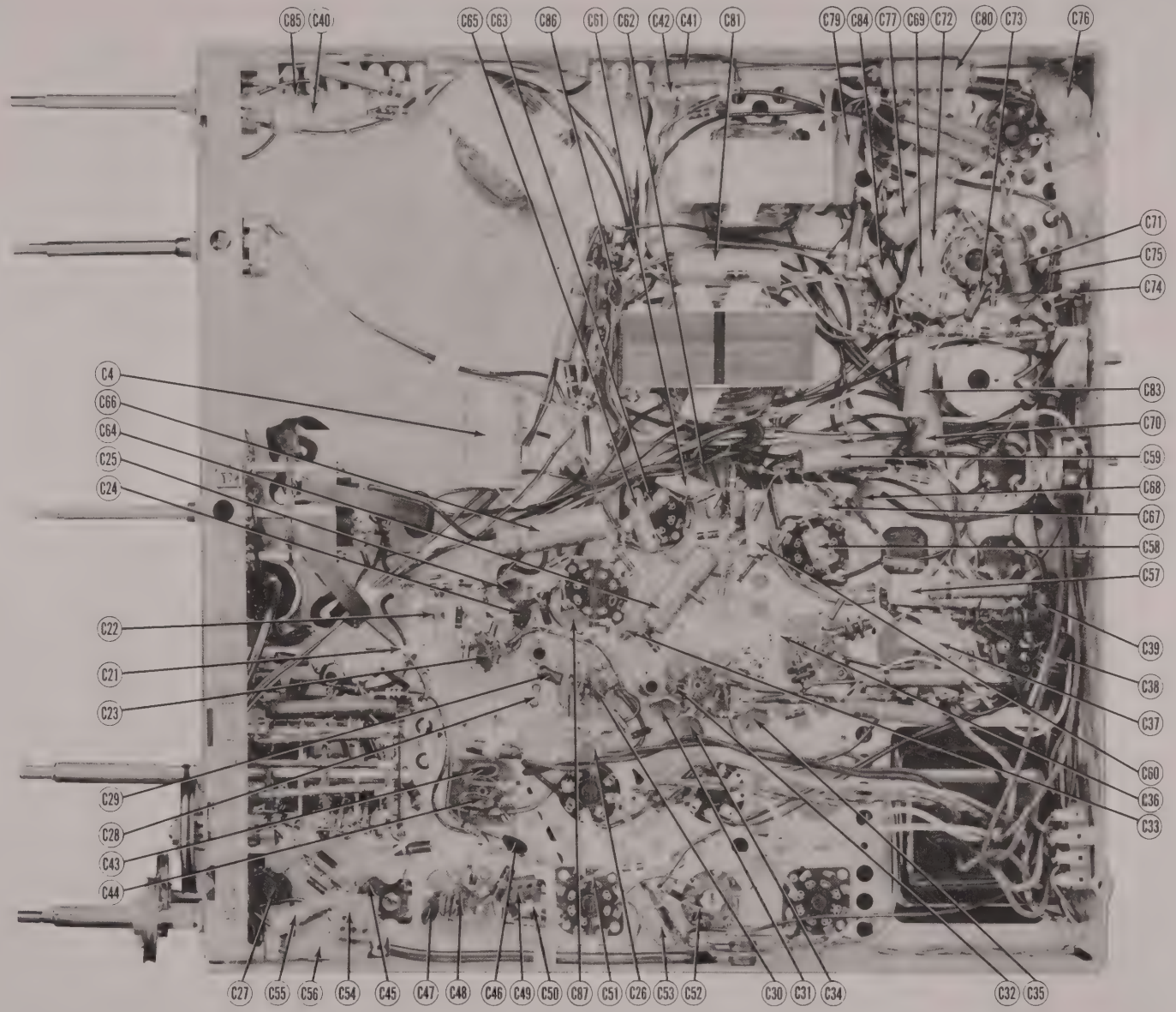
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	0Ω	†13KΩ	0Ω	.1Ω	†13KΩ	†13KΩ	200Ω		
V 2	12AT7	†4KΩ	22KΩ	1.2Ω	6Ω	.1Ω	†28KΩ	800KΩ	0Ω	0Ω
V 3	6AU6	100KΩ	0Ω	0Ω	.1Ω	†1000Ω	†24KΩ	47Ω		
V 4	6AU6	200KΩ	0Ω	0Ω	.1Ω	†1000Ω	†24KΩ	47Ω		
V 5	6AU6	56KΩ	0Ω	0Ω	.1Ω	†2KΩ	†25KΩ	0Ω		
V 6	6AL5	0Ω	3.9Meg.	.1Ω	0Ω	0Ω	0Ω	5KΩ		
V 7	12AU7	#26KΩ	1 Meg.	0Ω	0Ω	0Ω	†5KΩ	1 Meg.	120Ω	.1Ω
V 8	6AU6	.1Ω	0Ω	0Ω	.1Ω	†23KΩ	†56KΩ	120Ω		
V 9	6AU6	.1Ω	0Ω	0Ω	.1Ω	†23KΩ	†150KΩ	120Ω		
V 10	6SH7	0Ω	0Ω	0Ω	56KΩ	0Ω	†220KΩ	.1Ω	†2KΩ	
V 11	6AQ7GT	.1Ω	120KΩ	240KΩ	INF	INF	0Ω	.1Ω	0Ω	
V 12	6SN7GT	3.9 Meg.	# 280KΩ # 35KΩ	6.8KΩ	2.2 Meg.	†16KΩ	1000Ω	0Ω	.1Ω	
V 13	6SN7GT	75KΩ	#220KΩ	0Ω	150KΩ	# 2.1Meg # 1.9Meg.	0Ω	0Ω	.1Ω	
V 14	6V6GT	INF	.1Ω	†1.5KΩ	# 230KΩ # 35KΩ	# 2.1Meg. # 1.9Meg.	58KΩ	0Ω	1.4KΩ 420Ω	
V 15	6SN7GT	200KΩ	#47KΩ	0Ω	1 Meg.	#40KΩ	300KΩ	0Ω	.1Ω	
V 16	6BG6G	INF	0Ω	82Ω	1 Meg.	1 Meg.	INF	.1Ω	#6KΩ	TOP CAP ♦ 75Ω
V 17	5V4G	INF	INF	INF	#170Ω	INF	#170Ω	INF	INF	
V 18	1B3GT	INF	INF	INF	INF	INF	INF	INF	INF	TOP CAP ♦ 470KΩ
V 19	5U4G	INF	40KΩ	INF	25Ω	INF	23Ω	INF	40KΩ	
V 20	5Y3GT	INF	40KΩ	INF	20Ω	INF	22Ω	INF	40KΩ	
V 21	12KP4	1.3 Meg.	† 5KΩ	PIN 10 ♦100KΩ	PIN 11 320KΩ	PIN 12 1.3 Meg.				
V 22	6AG5	2 Meg.	0Ω	0Ω	.1Ω	▲11KΩ	▲100KΩ	0Ω		
V 23	6AK5	2 Meg.	0Ω	0Ω	.1Ω	▲16KΩ	▲100KΩ	0Ω		
V24A	6AK5	22KΩ	0Ω	0Ω	.1Ω	▲5KΩ	▲5KΩ	0Ω		
‡ B	6AK5	22KΩ	0Ω	0Ω	.1Ω	▲5KΩ	▲5KΩ	0Ω		
V25	6BG7	0Ω	0Ω	220Ω	1 Meg.	220Ω	▲10KΩ	.1Ω	▲3KΩ	
V26	6SV7	0Ω	1.5Ω	470Ω	▲5KΩ	0Ω	▲3KΩ	0Ω	.1Ω	
V27A	6SV7	0Ω	200KΩ	0Ω	▲INF	1 Meg.	▲28KΩ	0Ω	.1Ω	
‡ B	6SV7	0Ω	120KΩ	0Ω	▲120KΩ	1 Meg.	▲28KΩ	0Ω	.1Ω	
‡V23	6AQ7GT	240KΩ	120KΩ	.8Ω	1 Meg.	▲5KΩ	100KΩ	0Ω	.1Ω	
V29	6AL7GT	0Ω	0Ω	▲120Ω	700KΩ	700KΩ	700KΩ	.1Ω	4.7KΩ	
♦V30	6SC7	0Ω	▲120KΩ	4.7 Meg.	4.7 Meg.	▲100KΩ	0Ω	25Ω	25Ω	
V31	6SQ7	0Ω	10 Meg.	0Ω	0Ω	0Ω	▲100KΩ	0Ω	.1Ω	
V32	6SN7GT	1 Meg.	▲34KΩ	36KΩ	1 Meg	▲48KΩ	♦1.8KΩ	25Ω	25Ω	
V33	6V6GT	0Ω	25Ω	▲160Ω	▲200Ω	220KΩ	220KΩ	25Ω	150Ω	
V34	6V6GT	0Ω	25Ω	▲160Ω	▲200Ω	220KΩ	220KΩ	25Ω	150Ω	
V35	6V6GT	0Ω	25Ω	▲160Ω	▲200Ω	220KΩ	220KΩ	25Ω	150Ω	
V36	6V6GT	0Ω	25Ω	▲160Ω	▲200Ω	220KΩ	220KΩ	25Ω	150Ω	
V37	5U4G	INF	60KΩ	INF	31Ω	INF	29Ω	INF	60KΩ	

‡ Taken in FM position.
† Measured from pin 8 of V20.
# Measured from pin 8 of V19.
♦ Measured from pin 8 of V17.
▲ Measured from pin 8 of V37
♦ Measured in "Phono" position.

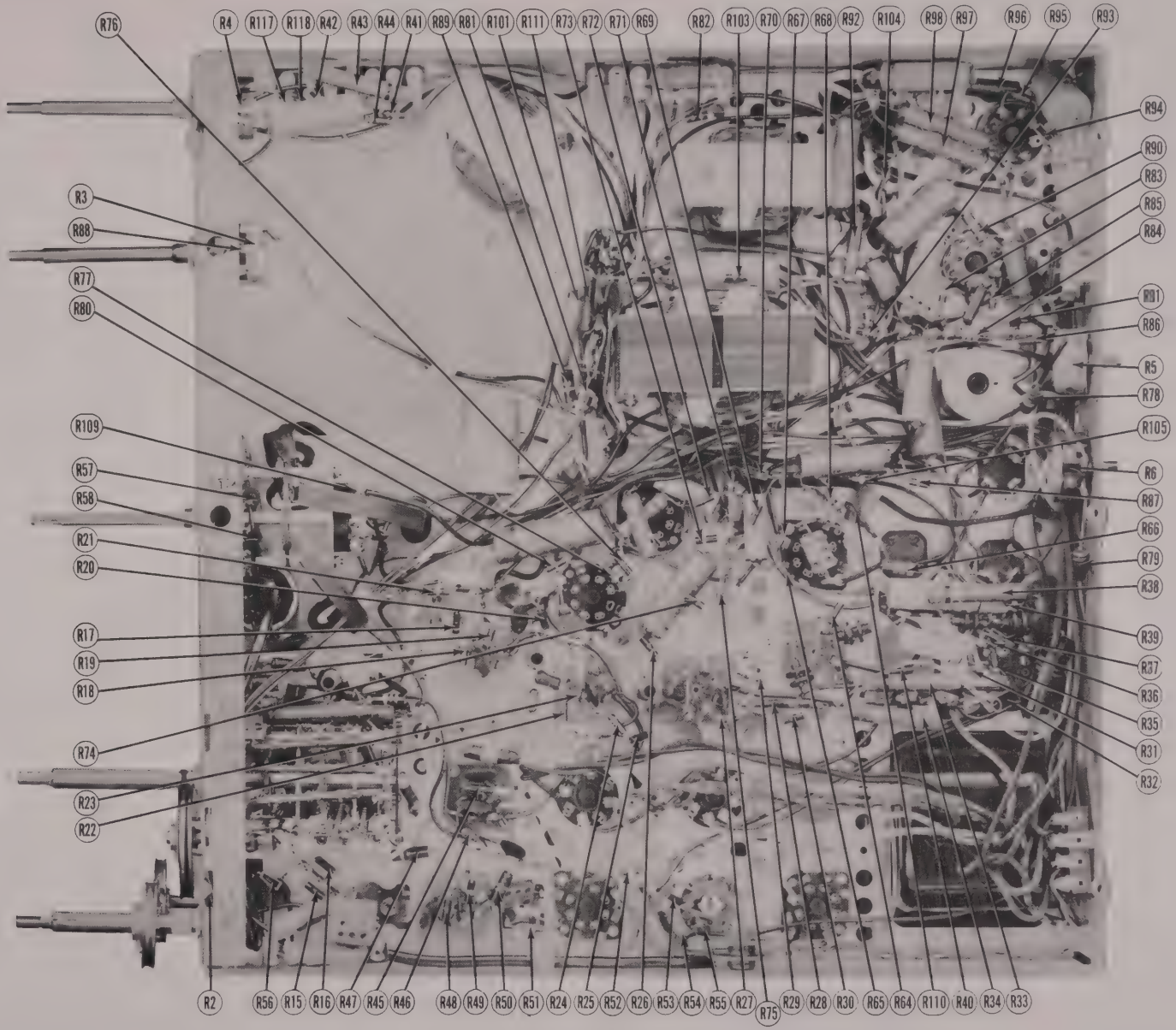
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



RADIO CHASSIS-BOTTOM VIEW
TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



TV CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



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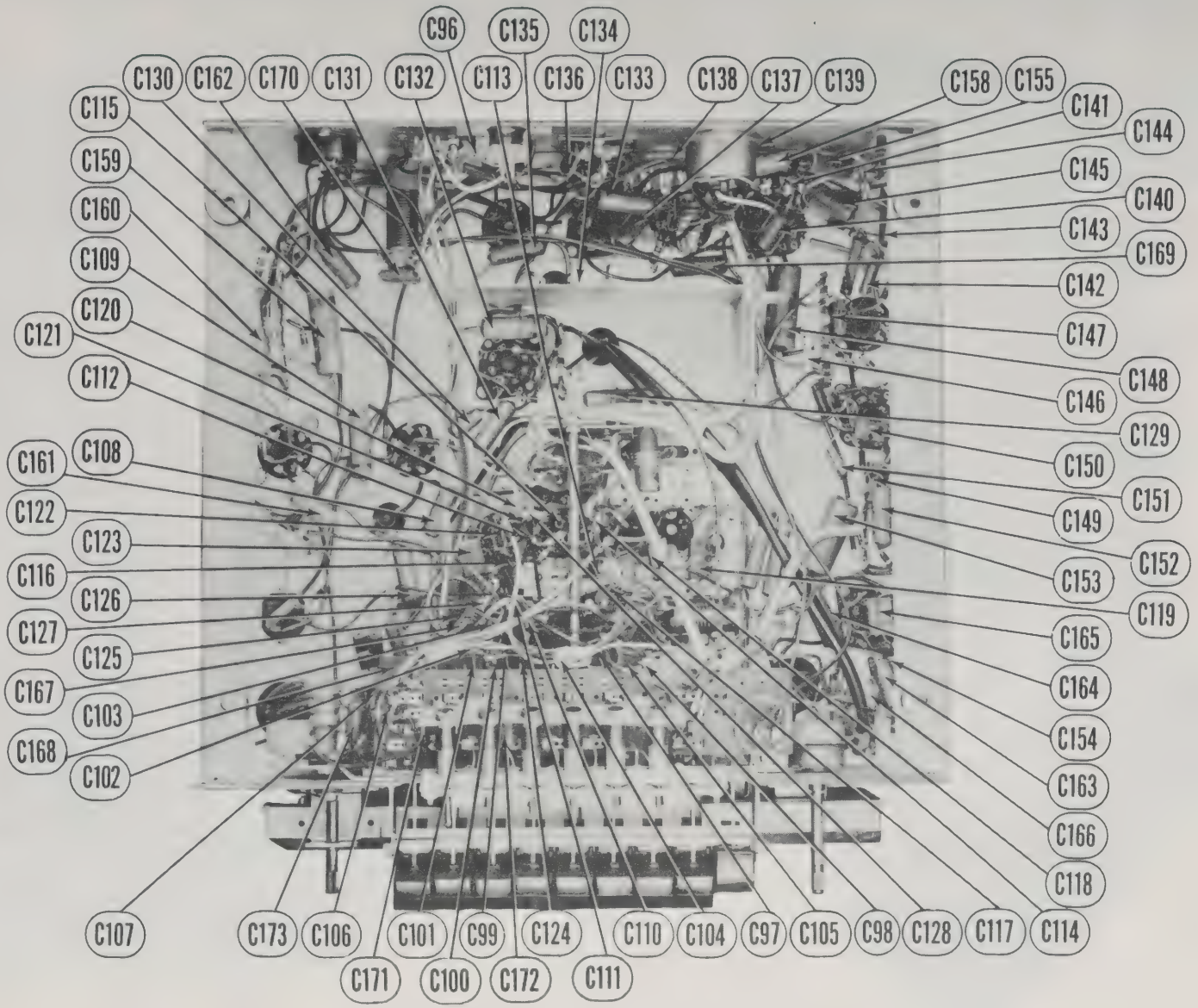

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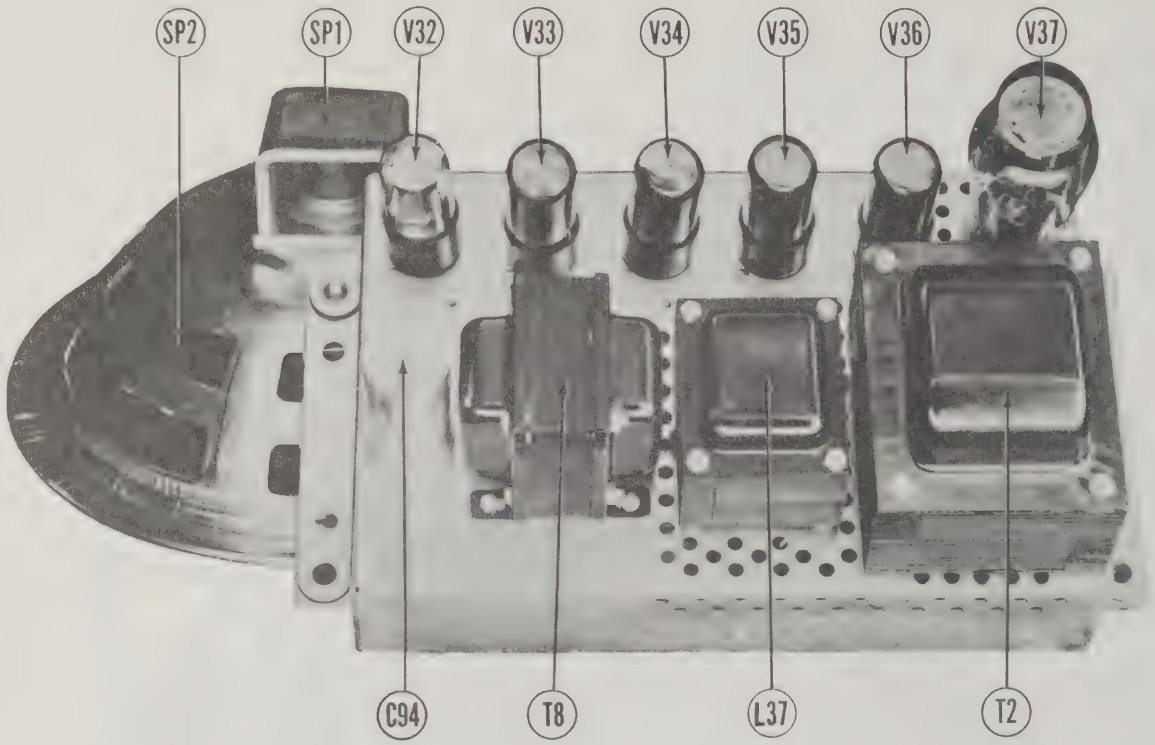
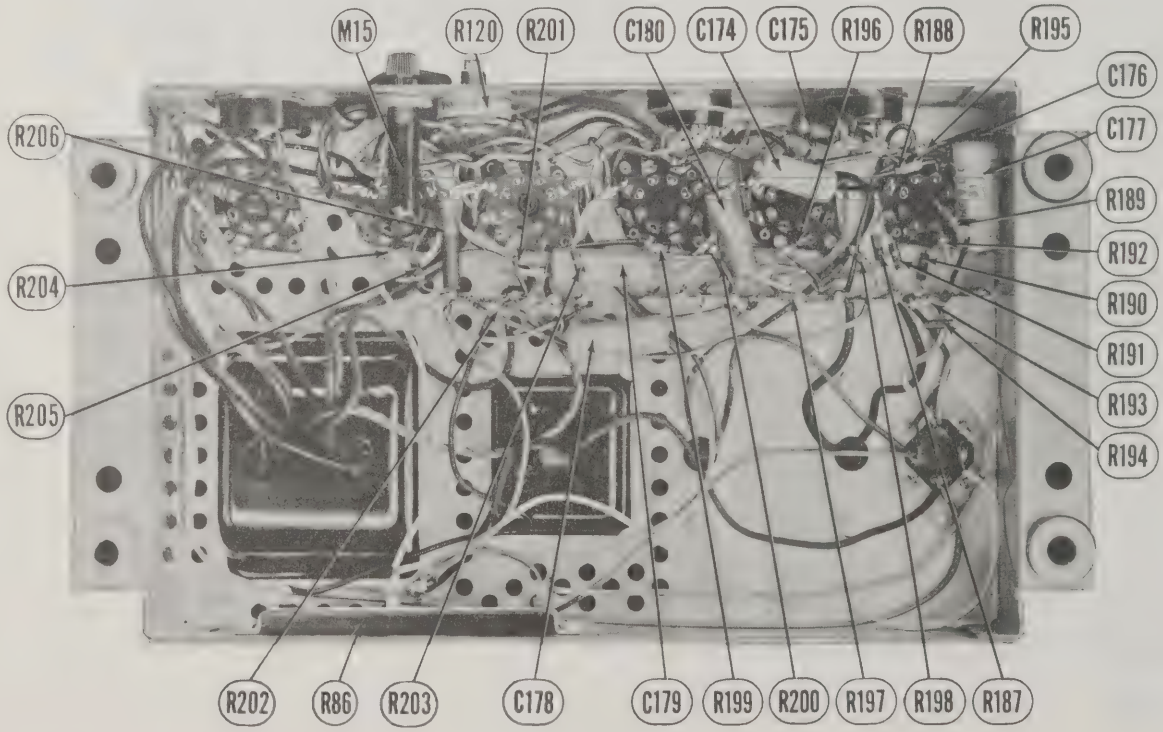
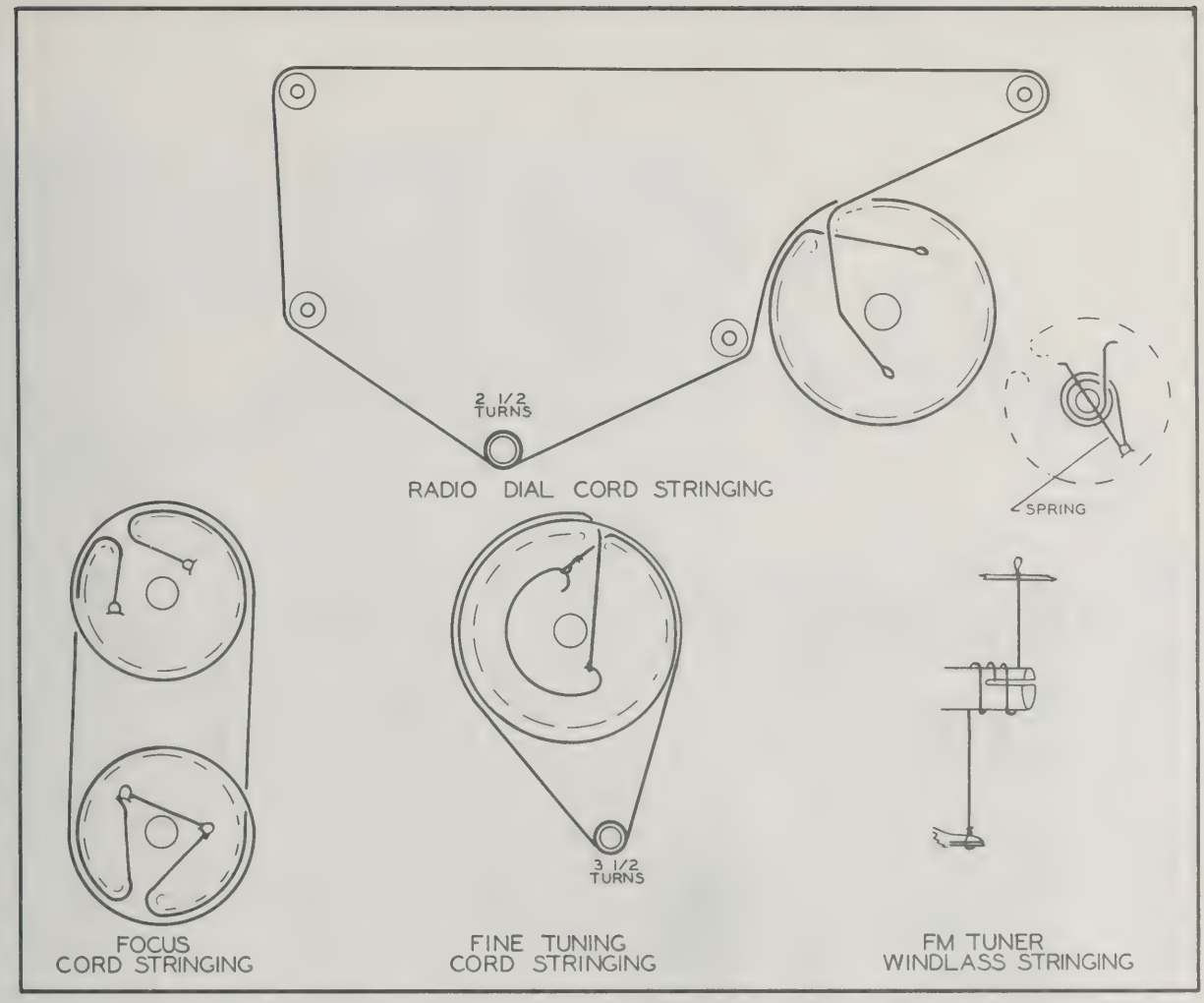


AUDIO AND POWER SUPPLY CHASSIS–TOP VIEW



AUDIO AND POWER SUPPLY CHASSIS–BOTTOM VIEW



HORIZONTAL OSCILLATOR FREQUENCY ADJUSTMENTS

The horizontal frrequency is a course adjustment to set the front panel hold control to obtain synchronization at approximately the center of its range. The core (Bl) of the blocking oscillator transformer sets the natural frequency of the system.

Connect a VTVM to the junction of the contrast control and R117. Tune in a TV station and set the front panel horizontal hold control to the center of its range. Alternately adjust the horizontal frequency trimmer and the slug Bl until the picture synchronizes horizontally with the VTVM reading between 11 and 13 volts.

The picture should fall out of synchronization when the front panel control is turnedto either extreme of its rotation.

CENTERING ADJUSTMENTS

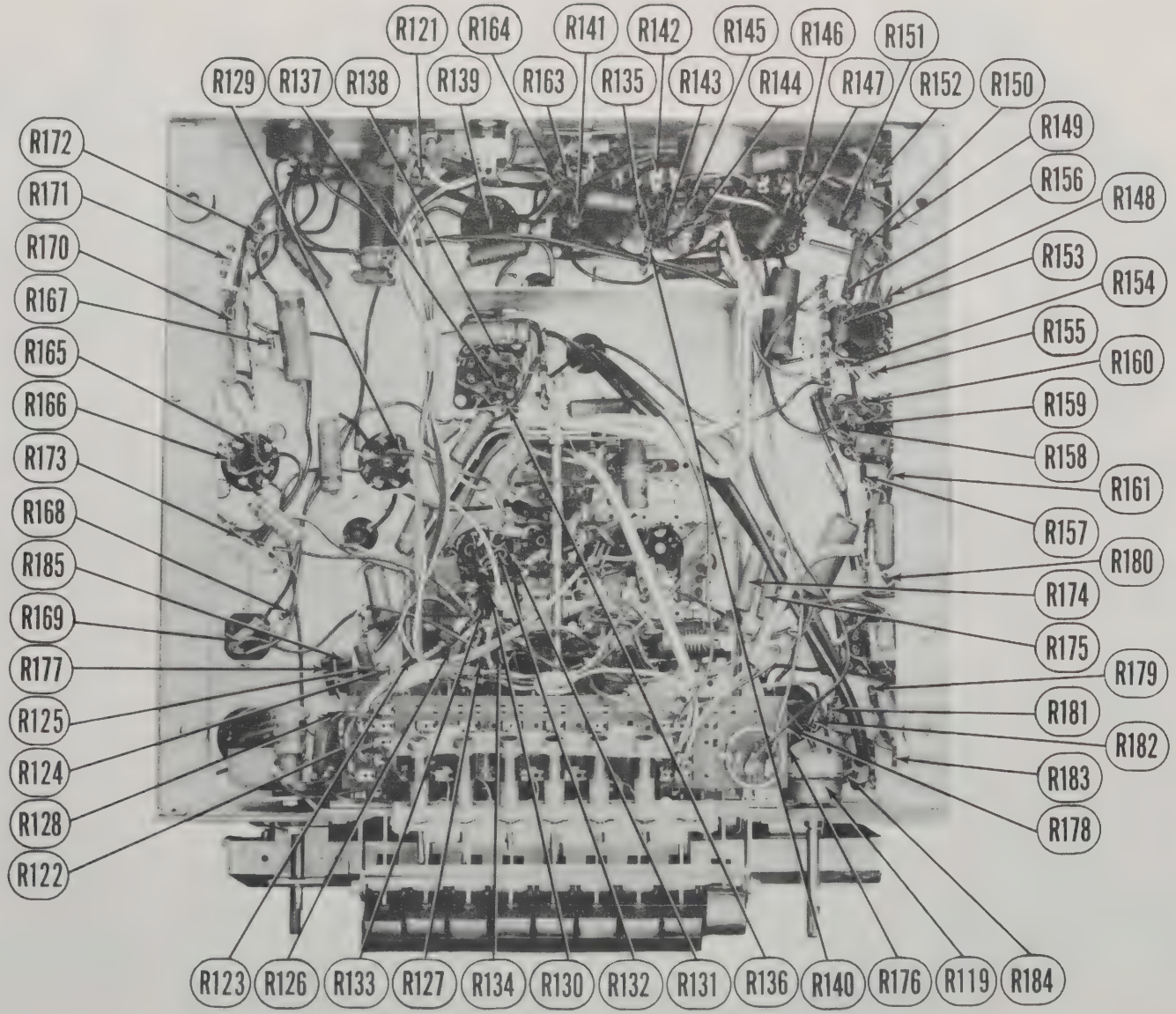
Centering adjustments are made by means of two circular magnets mounted on the focus and deflection assembly. The assembly may be turned the necessary direction, and the amount of correction may be changed by rotating thelarge magnet with respect to the smaller one, and by sliding the two magnets together or apart. Maximum effect is obtained with the magnets close together and aligned. Minimum effect is achieved by turning the large magnet to oppose the smaller one.

HORIZONTAL LINEARITY ADJUSTMENTS

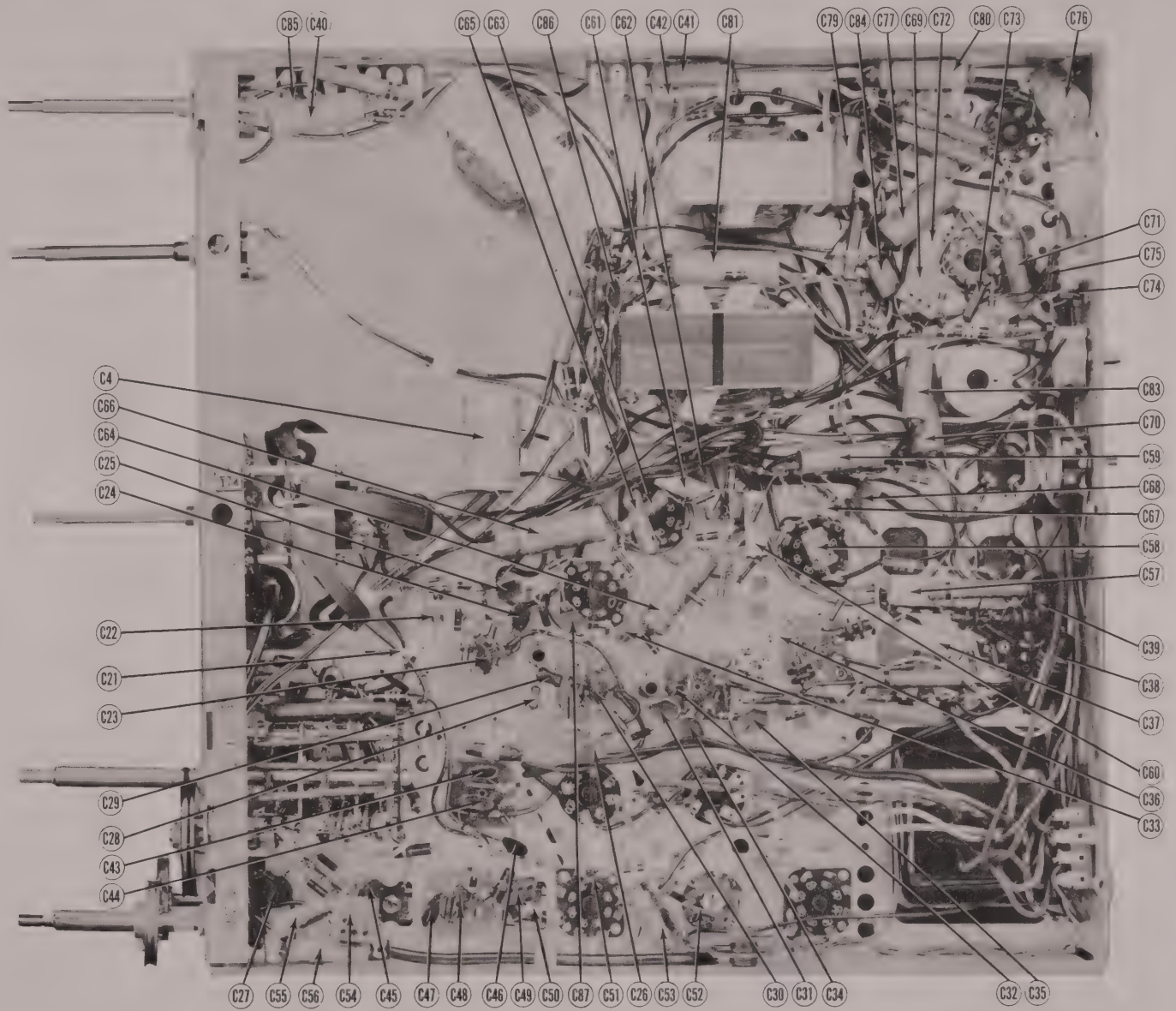
The horizontal drive trimmer should be turned to minimum capacity. With the horizontal size slug adjusted to approximately its correct position, adjust the horizontal linearity slug for the best linearity. If good linearity cannot be obtained, turn the horizontal drive trimmer slightly clockwise and repeat the adjustments. If there is a fold over of the pattern, turn the horizontal drive trimmer clockwise until the fold over disappears.

DISASSEMBLY INSTRUCTIONS

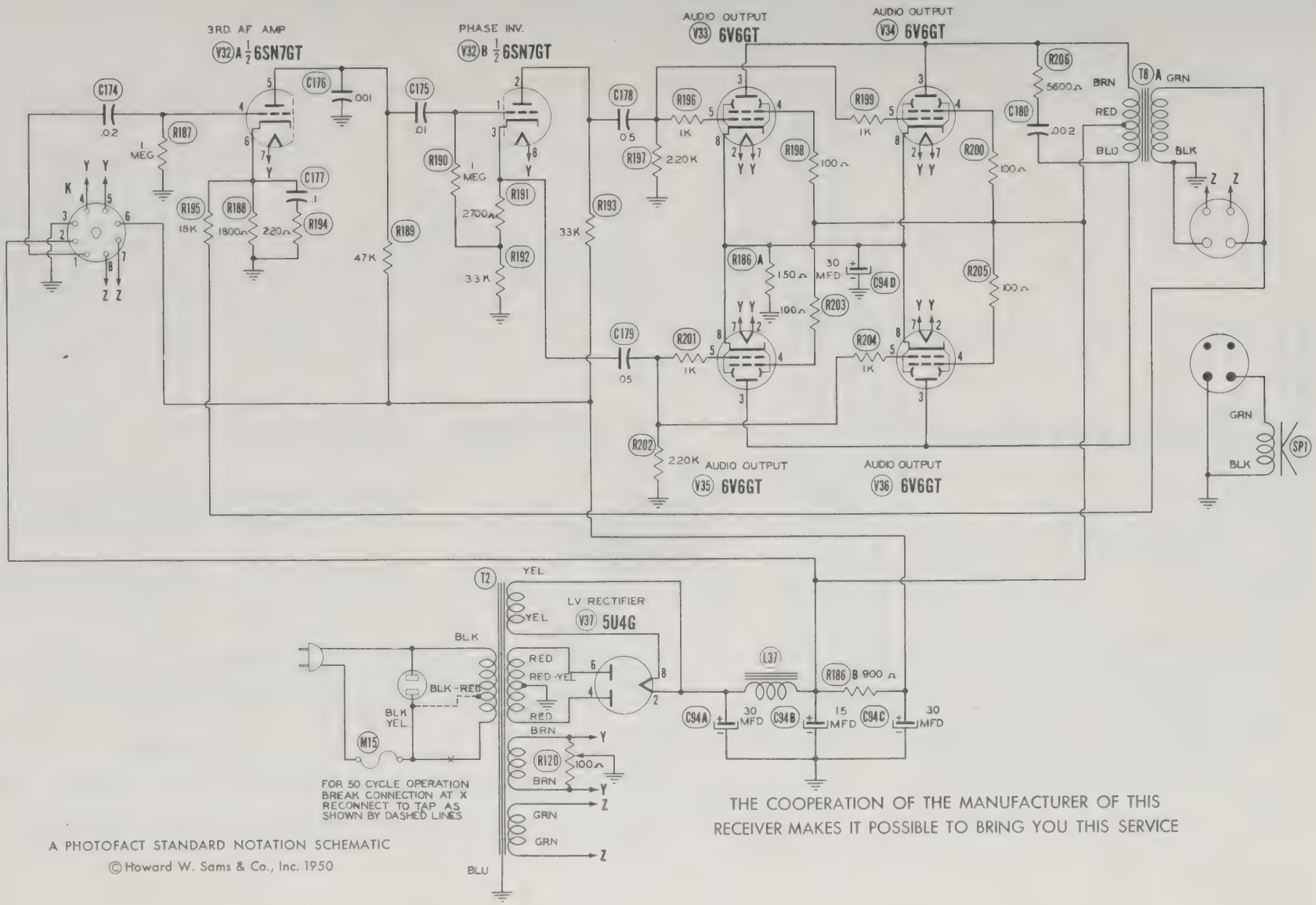
1. Remove the ten push-on type knobs.
2. Remove the 21 screws holding the radio section rear cover. Pull the loop antenna plug from the radio chassis and then remove the rear cover.
3. Remove the 6 screws holding the rear cover for the TV section.
4. Remove the phono power plug from the power-audio chassis.
5. Remove the cable connecting the power-audio chassis to the receiver chassis.
6. Disconnect the speaker plug from the power-audio chassis.
7. Disconnect the power-audio chassis power plug from the rear of the radio chassis.
8. Remove the four phillips head screws holding the power-audio chassis. Remove chassis.
9. Loosen four screws holding the plate under the TV chassis. Slide plate to the rear and remove.
10. Remove the plug from the front center part of the TV chassis.
11. Disconnect the radio power plug from the TV chassis.
12. Disconnect the antenna lead from the dipole terminals on the receiver chassis.
13. Remove the picture tube socket.
14. Disconnect the yoke plug.
15. Disconnect the picture tube front support ground plug.
16. Disconnect the high voltage lead from the picture tube.
17. Disconnect the horizontal deflection yoke plug.
18. Remove two 1/4" hex head bolts holding brass strip to the TV chassis.
19. Remove five 5/16" hex head bolts holding the TV chassis. Remove chassis.
20. Reove the panel lamp from the front bottom portion of the cabinet.
21. Remove the phono audio plug from the receiver chassis.
22. Remove four screws holding the radio chassis. Remove chassis.
23. Remove four 11/32" hex nuts holding the speaker. Remove the speaker.



RADIO CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION



TV CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

AUDIO AND POWER SUPPLY SCHEMATIC

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		G. E. PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6AU6	6AU6	7BK	
V2	Converter	12AT7	12AT7	9A	
V3	1st Video IF Amp.	6AU6	6AU6	7BK	
V4	2nd Video IF Amp.	6AU6	6AU6	7BK	
V5	3rd Video IF Amp.	6AU6	6AU6	7BK	
V6	Video Det.-Clamper	6AL5	6AL5	6BT	
V7	Video Amp.	12AU7	12AU7	9A	
V8	1st Sound IF Amp.	6AU6	6AU6	7BK	
V9	2nd Sound IF Amp.	6AU6	6AU6	7BK	
V10	Limiter	6SH7	6SH7	8BK	
V11	Disc.	6AQ7GT	6AQ7GT	8CK	Also AF Amp. on Model 830 and 835
V12	Sync. Amp.-Sync. Clipper	6SN7GT	6SN7GT	8BD	
V13	Vertical Multi-vribrator	6SN7GT	6SN7GT	8BD	
V14	Vert. Output	6V6GT	6V6GT	7AC	
V15	Hor. AFC-Hor. Osc.	6SN7GT	6SN7GT	8BD	
V16	Hor. Output	6BG6G	6BG6G	5BT	
V17	Damper	5V4G	5V4G	5L	
V18	HV Rectifier	1B3GT	1B3GT	3C	
V19	LV Rectifier	5U4G	5U4G	5T	
V20	LV Rectifier	5Y3GT	5Y3GT	5T	
V21	Picture Tube	12KP4	12KP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C1A	30	450	RCE-076	AF663J6B	UP9DJ674			▲ Filter
B	30	450						■ Filter
C	15	450						▲ Vert. Osc. Dec.
D	30	50						Vertical Output Cathode *
C2A	15	450		AF66J	UP9CJ677			▲ Filter †
B	30	450		PRS450/16				■ Filter
C	30	450						▲ Filter
C2A	15	450	RCE-077	AF3662J	UP9DJ984		TVL-58	▲ Filter † §
B	30	450						■ Filter
C	30	450						▲ Filter
D	10	450						Filter
C3	2000	6	RCE-028	PRS6-2000	UP7AJ231		TVL-43	Filter
C4	20	450	RCE-093	PRS450/20	BR2045		TVA-18	Vert. Output Dec.
C5	25	25	RCE-086	PRS25/25	BR252A		TVA-6	Output Cathode Bypass † §
C6	100		RCW-1047			GP1K-100		RF Coupling
C7	1500		RCW-026			GP2L-0015		RF Cathode Bypass
C8	5000		RCW-3014			811-005		RF Bypass
C9	1500		RCW-026			GP2L-0015		Osc. Plate Bypass
C10	6		RCW-2030					Osc. Feedback
C11	12		RCW-2006			GP1K-12		Osc. Grid Cap.
C12	47		RCW-1052			GP1K-47		RF Coupling
C13	47		RCW-4010			GP1K-47		RF Coupling
C14	47		RCW-1052			GP1K-47		RF Coupling
C15	1.5		RCW-1045			NPOK-1.5		Osc. Coupling
C16	5		RCW-2035			NPOK-5		Fixed Trimmer
C17	5000		RCW-3014			811-005		Conv. Decoupling
C18	12	500	UCU-1506			GP1K-12		Fixed Trimmer
C19	1500		RCW-026			GP2L-0015		RF Fil. Bypass
C20	5000		RCW-3014			811-005		Conv. Fil. Bypass
C21	100		RCW-1047	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C22	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C23	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st V. IF Screen Bypass
C24	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st V. IF Plate Decoupling
C25	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C26	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C27	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C28	2.5		RCW-3017					Sound IF Coupling
C29	100		RCW-1047	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C30	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd V. IF Screen Bypass
C31	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd V. IF Plate Decoupling
C32	100		RCW-1047	1468-0001	5W5T1	GP1K-100	1FM-31	IF Coupling
C33	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	AGC Filter
C34	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Screen Bypass
C35	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	3rd V. IF Decoupling
C36	6		RCW-1002					IF Coupling
C37	.05	200	UCC-635	P288-05	GT2S5		TM-15	Video Coupling
C38	.047	600	RCN-014	P688-047	GT6S5		TM-15	Video Coupling
C39	390	500	UCU-1542	1468-0004	5W5T4	GP2K-390	1FM-34	2nd Video Cathode Bypass
C40	.2	200	UCC-014	P488-22	GT4P2		TC-2	Pic. Tube Cathode Decoupling ♦
C41	.02	600	UCC-041	P688-02	GT6S2		TM-12	Vert. Sweep Coupling †
C42	.05	600	UCC-635	P688-05	GT6S5		TM-15	Voltage Divider †
C43	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st S. IF Cathode Bypass
C44	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st S. IF Screen Bypass
C45	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	1st S. IF Plate Decoupling
C46	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C47	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd S. IF Cathode Bypass
C48	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	2nd S. IF Screen Bypass
C49	100	500	UCU-1528	1468-0001	5W5T1	GP1K-100	1FM-31	2nd S. IF Coupling
C50	47		RCW-1043	1468-00005	5W5Q5	GP1K-47	1FM-45	Lim. Grid Filter
C51	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Lim. Screen Bypass
C52	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Lim. Plate Decoupling
C53	150	500	UCU-1532	1468-00015	5W5T15	GP2K-150	1FM-315	Diode Load Cap.
C54	1000	500		1468-001	1W5D1	GP2L-001	1FM-21	De-emphasis †
C55	.002	600	UCC-621	P688-002	GT6D2	GP2M-002	TM-22	Audio Coupling **
C56	.01	200	UCC-630	P488-01	GT2S1	GP2-335-01	TM-11	Tone Compensation
C57	.05	600	UCC-635	P688-05	GT6S5		TM-15	Video Coupling
C58	100	500	UCU-1528	1468-0001	5W5T1	GP1K-100	1FM-31	Video Coupling

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C59	.05	400	UCC-635	P488-05	GT4S5		TM-15	Integrator Network
C60	.01	200	UCC-025	P488-01	GT2S1	GP2-335-01	TM-11	Integrator Network
C61	.01	200	UCC-025	P488-01	GT2S1	GP2-335-01	TM-11	Integrator Network
C62	.001	400	UCC-012	P688-001	GT6D1	GP2L-001	TM-21	Vert. Sync. Coupling
C63	.002	600	UCC-621	P688-002	GT6D2	GP2M-002	TM-22	Vert. MV Feedback
C64	.05	600	UCC-635	P688-05	GT6S5		TM-15	Vert. MV Feedback
C65	.001	400	UCC-012	P688-001	GT6D1	GP2L-001	TM-21	Vert. MV Grid Cap.
C66	.1	600	UCC-640	P688-1	GT6P1		TM-1	Vert. Discharge
C67	390	500	UCU-1542	1468-0004	5W5T4	GP2K-390	1FM-34	Sync. Clipper Cath. Bypass
C68	120	500	UCU-1530			GP2K-120		Hor. Sync. Coupling
C69	2200	500	UCU-2560			GP2M-0022		Hor. Sync. Coupling
C70	.2	200	UCC-014	P488-22	GT4P2		TC-2	AFC Filter
C71	.002	200	UCC-621	P688-002	GT6D2	GP2M-002	TM-22	AFC Filter
C72	.05	600	UCC-635	P688-05	GT6S5		TM-15	AFC Plate Bypass
C73	180	500	UCU-2534			GP2K-180		Hor. Osc. Grid Cap.
C74	1500	500	RCU-285	1467-0015	1W5D15	GP2L-0015	1FM-215	Hor. Discharge ††
C75	390	500	UCU-1542	1468-0004	5W5T4	GP2K-390	1FM-34	Hor. Sweep Coupling
C76	.5	200	RCC-016	P288-5	GT2P5		TC-5	Hor. Output Cathode Bypass
C77	.1	600	UCC-640	P688-1	GT6P1		TM-1	Hor. Output Screen Bypass
C78	.0022	1000	RCN-019	P1088-0022	GT16D2		MB-22	Hor. Sweep Coupling
C79	.05	400	UCC-635	P488-05	GT4S5		TM-15	Damper Filter
C80	.1	400	UCC-640	P488-1	GT4P1		TM-1	Damper Filter
C81	.5	200	RCC-016	P288-5	GT2P5		TC-5	Hor. Sweep Coupling
C82	500	20000	RCN-023					HV Filter
C83	.01	600	RCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Decoupling
C84	4	800	RCN-020					Hor. AFC Feedback
C85	.05	200	UCC-635	P288-05	GT2S5		TM-15	Contrast Control Bypass
C86	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	RF Bypass
C87	5000		RCW-3014	1467-005	1D5D5	811-005	29C1	Vert. Out. Fil. Bypass
C88	120	500	UCU-1530			GP2K-120		Voltage Divider ††
C89	.02	600	UCC-631	P688-02	GT6S2		TM-12	Audio Coupling ‡ §
C90	47		RCW-1043	1468-00005	5W5Q5	GP1K-47	1FM-45	AF Grid Bypass §
C91	390	500	UCU-1542	1468-0004	5W5T4	GP2K-390	1FM-34	AF Plate Bypass ‡ §
C92	.01	600	RCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling ‡§
C93	.005	600	RCC-039	P688-005	GT6D5	GP2M-005	TM-25	Output Plate Bypass ‡§

* Model 835 use 100MFD in this application. MFG'S. Part No. RCE-085 is used in place of RCE-076.
† Used only in model 840.
‡ Used only in model 835.
§ Used only in model 830.
♦ Models 830 and 835 use .1MFD in this application.
†† Model 835 use 2200MMFD in this application.
•• Models 830 and 835 use .01MFD in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	3000Ω	25	RRW-033			Focus Control, Wire Wound
R1	1000Ω	4	RRW-088		10-1000	Focus Control, Wire Wound *
R2	2 Meg.	½	RRC-085		K-68J384-1	Volume control, tapped at 500KΩ
R3A	50KΩ	½	RRC-090	B11-123 ††	K-68J87-1	Horiz. Hold Control, Rear (Dual Concentric)
B	50KΩ	½		B11-123 ††		Vert. Hold Control Front
C	Shaft End			E202 ††		Attach per instructions in "Concentrikit".
R4A	7500Ω	½	RRC-089		K68J86-1	Brightness Control (Dual Concentric)
B	500KΩ	½				Contrast Control
R4A	100KΩ	½	RRC-101			Brightness Control (Dual Concentric) #
B	500KΩ	½				Contrast Control
R5	250KΩ	½	RRC-084	Q11-130	M-55-S	Vert. Size Control
R5	100KΩ	½	RRC-087	Q11-128	M-49-S	Vert. Size Control *
R6	1000Ω	2	RRC-086	W-1000	58-1000	Vert. Linearity Control

* Used in model 835 only.
# Used in models 835 and 830 Only.
†† Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 5% UNLESS OTHERWISE STATED:
R7	200Ω	½	URD-1032		RF Cathode
R8	6200Ω	1	URE-1068		RF Plate
R9	5600Ω	1	URE-1067		RF Plate
R10	220KΩ	½	URD-1105		Conv. Grid
R11	24KΩ	½	URD-1082		Conv. Plate Transformer Shunt
R12	27KΩ	1	URE-083		Conv. Decoupling
R13	22KΩ	½	URD-1081		Osc. Grid
R14	3000Ω	1	URE-1060		Osc. Plate
R15	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Voltage Divider
R16	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Bias Network
R17	2700Ω	½	URD-1059		1st Video IF Grid
R18	47Ω	½	URD-1017		1st Video IF Cathode
R19	24KΩ	½	URD-1082		1st Video IF Screen
R20	1000Ω 20%	½	URD-049	BTS-1000	1st Video IF Plate Decoupling
R21	100KΩ 20%	½	URD-097	BTS-100K	Bias Network
R22	1500Ω	½			2nd Video IF Grid
R23	47Ω	½	URD-1017		2nd Video IF Cathode
R24	24KΩ	½	URD-1082		2nd Video IF Screen
R25	1000Ω 20%	½	URD-049	BTS-1000	2nd Video IF Plate Decoupling
R26	2700Ω	½	URD-1059	BTS-2700-5%	3rd Video IF Grid
R27	24KΩ	½	URD-1082		3rd Video IF Screen
R28	1000Ω 20%	½	URD-049	BTS-1000	3rd Video IF Decoupling
R29	43KΩ	½	URD-1088		3rd Video IF Transformer Shunt
R30	5100Ω	½	URD-1066		Video Det. Diode Load
R31	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Video Amp. Grid
R32	5100Ω	1	URE-1066		Video Amp. Plate
R33	10KΩ	2	URF-1073	BT-2-10K-5%	Video Amp. Plate
R34	11KΩ	2	URF-1074	BT-2-10K-5%	Video Amp. Plate
R35	5600Ω	½	URD-1067	BTS-5600-5%	Voltage Divider
R36	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Video Amp. Grid

TV PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G E PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R37	120Ω	½	URD-1027	BW-½-120-5%	Video Amp. Cathode
R38	3300Ω	2	URF-1061	BT-2-3300-5%	Video Amp. Plate
R39	1000Ω	½	URD-1049	BTS-1000-5%	Video Amp. Plate
R40	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Filament Isolation See Note 1
R41	24KΩ	½	URD-1082		Bias Network See Note 2
R42	270KΩ	½	URD-107	BTS-270K-5%	Voltage Divider See Note3
R43	20KΩ	2	URF-1080		Voltage Divider
R44	4700Ω	½	URD-1065	BTS-4700-5%	Voltage Divider
R45	120Ω	½	URD-1027		1st Sound IF Cathode
R46	56KΩ 10%	½	URD-091		1st Sound IF Screen
R47	22KΩ	1	URE-1081		1st Sound IF Plate Decoupling
R48	120Ω	½	URD-1027		2nd Sound IF Cathode
R49	150KΩ 10%	½	URD-101		2nd Sound IF Screen
R50	22KΩ	1	URE-1081		2nd Sound IF Plate
R51	56KΩ 10%	½	URD-091		Limiter Grid
R52	220KΩ 10%	½	URD-105		Limiter Screen
R53	1000Ω 20%	½	URD-049	BTS-1000	Limiter Plate Decoupling
R54	68KΩ 20%	½	URD-093	BTS-68K	De-emphasis
R55	68KΩ 20%	½	URD-093	BTS-68K	De-emphasis
R56	82KΩ	½	URD-095	BTS-82K-5%	Tone Compensation
R57	18KΩ 10%	2	URF-079	BT-2-18K	Bleeder See Note 2
R58	18KΩ 10%	2	URF-079	BT-2-18K	Bleeder See Note 2
R59	1000Ω	½	URD-049	BTS-1000-5%	Tone Compensation See Note 4
R60	10 Meg.	½	URD-145	BTS 10 Meg.	AF Grid See Note 4
R61	220KΩ	½	URD-105	BTS-220K-5%	AF Plate See Note 4
R62	470KΩ	½	URD-113	BTS-470K- 5%	Output Grid See Note 4
R63	750Ω	1	URE-1046	BW-1-820	Output Cathode See Note 4
R64	2.2 Meg. 20%	½	URD-129	BTS-2.2 Meg.	Sync. Phase Inv. Grid
R65	1000Ω 20%	½	URD-049	BTS-1000	Sync. Phase Inv. Cathode
R66	15KΩ 10%	1	URE-077	BTA-15K	Sync. Phase Inv. Plate
R67	3.9 Meg.10%	½	URD-135	BTS-3.9 Meg.	Sync. Clipper Grid
R68	6800Ω 10%	½	URD-069	BTS-6800	Sync. Clipper Cathode
R69	1500Ω	½		BTS-1500-5%	Sync. Clipper Plate
R70	8200Ω 10%	½	URD-071	BTS-8200	Integrator
R71	8200Ω 10%	½	URD-071	BTS-8200	Integrator
R72	75KΩ	½	URD-1094		Vert. MV Grid
R73	220KΩ	½	URD-1105	BTS-220K-5%	Vert. MV Plate
R74	82KΩ	½	URD-1095	BTS-82K-5%	Vert. MV Grid
R75	24KΩ	½	URD-1082		Vert. MV Grid See Note 5
R76	2.2 Meg.	½	URD-1129	BTS-2.2Meg.5%	Vert. MV Plate
R77	10 Meg.20%	½	URD-145	BTS-10 Meg.	Vert. MV Plate See Note6
R78	33KΩ 10%	1	URE-085	BTA-33K	Voltage Divider
R79	470Ω 20%	1	URE-041	BTA-470	Vert. Output Cathode
R80	100KΩ 20%	½	URD-097	BTS-100K	Vert. Output Transformer Shunt
R81	820Ω 10%	2	URF-047	BT-2-820	Vert. Output Plate Decoupling
R82	[illegible]	½	URD-059	BTS-2700-5%	Differentiator See Note 2
R83	680KΩ 10%	½	URD-117	BTS-680K	Horiz. AFC Grid
R84	180KΩ	½	URD-1103	BTA-180K	Horiz. AFC Cathode
R85	82KΩ	½	URD-1095	BTS-82K-5%	Voltage Divider
R86	33KΩ	½	URD-1085	BTS-33K-5%	Bias Network
R87	8200Ω 10%	½	URD-095	BTS-8200	Horiz. AFC Filter Network See Note 7
R88	24KΩ	½	URD-1082		Voltage Divider
R89	100KΩ	1	URE-097	BTA-100K	Voltage Divider
R90	3.3Meg.10%	1	URE-133	BTA-3.3 Meg.	Voltage Divider
R91	82KΩ	½	URE-1095	BTS-82K-5%	Horiz. Osc. Grid
R92	50KΩ	2	URF-1089	BT-2-47K-5%	Horiz. Osc. Plate See Note 8
R93	470KΩ 10%	½	URD-113	BTS-470K	AFC Feedback See Note 9
R94	330Ω 20%	½	URD-037		Parasitic Supp.
R95	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Horiz. Output Grid
R96	[illegible]	2	URF-1023	BW-2-82-5%	Horiz. Output Cathode
R97	13KΩ	2	URF-1076	BT-2-12K-5%	Horiz. Output Screen
R98	13KΩ	2	URF-1076	BT-2-12K-5%	Horiz. Output Screen
R99	33Ω	1	URE-013		Parasitic Supp.
R100	470KΩ	1			Current Limiting
R101	3300Ω 20%	2	URF-081	BT-2-3300	Horiz. Size Coil Shunt
R102	4700Ω 20%	½	URD-065	BTS-4700	Horiz. Linearity Coil Shunt
R103	330Ω 10%	½	URD-037	BTS-330	Horiz. Centering
R104	560KΩ	½	URD-115	BTS-560K-5%	Feedback
R105	100KΩ 20%	½	URD-097	BTS-100K	Acc. Anode Decoupling
R106	330KΩ 20%	1	URE-109		HV Filter See Note 10
R107	330KΩ 20%	1	URE-109		HV Filter See Note 1
R108	330KΩ 20%	1	URE-109		HV Filter See Note 1
R109	1 Meg. 20%	½	URD-121	BTS-1 Meg.	Isolation
R110	[illegible]	½	RRW-034	BW-½-1	Filament Dropping, Wire Wound
R111	[illegible]	10	RRW-035	AB-900	Focus Coil Shunt, Wire Wound
R112	560Ω	7	RRW-028		Focus Coil Shunt See Note 11, Wire Wound
R113	2200Ω	2	URF-1057	BW-2-2200	Filter See Note 4
R114	1500Ω	½	URD-053	BTS-1500-5%	Vert. Output Transformer Shunt See Note 11
R115	[illegible]	2	URF-1074	BT-2-10K-5%	Voltage Divider See Note 4
R116	47KΩ	½	URD-1089	BTS-47K- 5%	Voltage Divider See Note 4
R117	82KΩ	½	URD-095	BTS-82K- 5%	Voltage Divider
R118	56KΩ	½	URD-091	BTS-56K- 5%	Voltage Divider

Note 1. Not used in model 835.
Note 2. Used only in model 840.
Note 3 Models 830 and 835 use 180KΩ resistor in this application.
Note 4. Used only in models 830 and 835.
Note 5. Resistor R75 is either shorted out or left in the cabinet when centering of vert. hold control is checked at factory.
Note 6. Resistor R77 may be removed from the circuit at the factory when the centering of vert. size control is checked.
Note 7. Model 835 uses 18KΩ resistor in this application.
Note 8. Model 835 uses 82KΩ resistor in this application.
Note 9. Model 835 uses 150KΩ resistor in this application.
Note 10. Model 835 uses 470KΩ resistor in this application.
Note 11. Used in model 835 only.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA GENERAL ELECTRIC PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.
T1A	117VAC at 2A	750VCT .127ADC 650VCT .092ADC	5VAC at 3A	5VAC at 2A	RTP-066			
		SEC. 4	SEC. 5	SEC. 6				
		5VAC at 2A	12.6VCT at 3.5A	6.3VAC at .6A				
B					RTP-062 †			
T2	117VAC at 1.35A	610VCT .175ADC	5VAC at 3A	6.3VAC at 3A	RTP-035	P-5059 and P-5014 ¶		
		SEC. 4 6.3VAC at 3A						

† Used in model 835.
¶ Mount P-5014 horizontally under chassis.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	NOTES
T3	120Ω Tap at 35Ω		RTM-003				Hor. Block Osc. Trans.
T4	35Ω	SEC. 1 200Ω	RLT-004 ∮				Hor. Output Trans.
		SEC. 2 10Ω					
		SEC. 3 750					
		SEC. 4 0Ω					
T4			RLT-003 †				Horiz. Output Trans.
T5	730Ω	11Ω	RTO-053			TSO-5	Vert. Output Trans.
T5			RTO-061 †				Vert. Output Trans.
T6A	17.5Ω		RLD-010				Hor. Deflection Coil
B	63Ω						Vert. Deflection Coil
T6A			RLD-006 †				Hor. Deflection Coil
B							Vert. Deflection Coil
T7	850Ω		RLF-021				Focus Coil
T7			RLF-013 †				Focus Coil
T7			RLF-017 ∮				Focus Coil

† Used in model 835.
∮ Primary and secondary windings only.
§ Used in model 830.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T8A	17KΩ CT	5Ω	110Ω CT	.15Ω	RTO-026	A-3303			
B					RTO-052 † ‖				

§ Used in model 830
† Used in model 835

SPEAKER

ITEM No.	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
SP1A	PM	5Ω	ROP-016	ST-102		
B	PM		ROP-017	MOD. P12-S	12A6	Used in model 840. Used in model 830. Used in model 835.
C	PM					
	CONE DIA.	V. C. DIA.				
SP2A	11 7/8"	1 1/4"				
B						
C	5 1/4"					

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
L1	.127A	[illegible]Ω	7 Henries	RLI-059	C-2309	C-2993	R-8120	
L2	.092A	160Ω	7 Henries	RLI-060	C-2309	C-2993	R-8120	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L3	Ant. Input Transformer	0Ω	0Ω	RLA-031		
L4	Compensating	0Ω		RLI-006		
L5	RF Cathode	.2Ω		RLI-003		Lo-Band
L6	RF Cathode	0Ω		RLI-006		Hi-Band only
L7	RF Plate Mixer Grid & Osc. Coils	0Ω		RLC-069		Channel 2
L8	RF Plate Mixer Grid & Osc. Coils	0Ω		RLC-070		Chanel 3
L9	RF Plate Mixer Grid & Osc. Coils	0Ω		RLC-071		Channel 4
L10	RF Plate Mixer Grid & Osc. Coils	[illegible]Ω		RLC-072		Channel 5
L11	RF Plate Mixer Grid & Osc. Coils	0Ω		RLC-073		Channel 6
L12	RF Plate & Mixer Grid	[illegible]Ω		RLA-032		Channel 7
L13	RF Plate & Mixer Grid	[illegible]Ω		RLA-032		Channels 8 and 9
L14	RF Plate and Mixer Grid	0Ω		RLA-032		Channels 10 and 11
L15	RF Plate and Mixer Grid	[illegible]Ω		RLA-032		Channels 12-13
L16	Osc. Coil	0Ω		RLC-074		Channel 7 (No Code Dot)
L17	Osc. Coil	0Ω		RLC-075		Channel 8-9 (Red Code Dot)
L18	Osc. Coil	0Ω		RLC-076		Channel 10-11 (Orange Code Dot)
L19	Osc. Coil	0Ω		RLC-077		Channel 12-13 (Yellow Code Dot)
L20	RF Choke	1.2Ω		RLI-019		
L21	1st Video IF	.5Ω CT		RTL-081		
L22	RF Choke	.2Ω		RLI-005		Video Carrier-Set Trap
L23	2nd Video IF	.5Ω CT		RTL-082		
L24	Sound Take-Off Trap	.5Ω		RLI-061		
L25	3rd Video IF	.5Ω CT		RTL-083		
L26	4th Video IF	.5Ω CT		RTL-089		
L27	Peaking	7Ω		RLI-038		Inductance -165 Microhenries
L28	Peaking	7Ω		RLI-038		Inductance-165 Microhenries
L29	Peaking	7Ω		RLI-038		Inductance-165 Microhenries
L30	Peaking	7Ω		RLI-038		Inductance-165 Microhenries
L31	1st Sound IF	.2Ω	.2Ω	RTL-090		
L32	2nd Sound IF	.2Ω		RTL-085		
L33	Disc. Trans.	.2Ω	.2Ω	RTD-007		
L34	Hor. Size	2.5Ω	10Ω	RLD-004		
L35	Hor. Linearity	30Ω		RLD-005		
L36	Fil. Choke	.5Ω		RLI-005		

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M1	.150A	RER-003		

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M3	RF Tuner	RJX-023	TV
M4	Switch		TV On-Off SW.
	Cabinet	RAV-073	Model 840
	Cabinet	RAV-082	Model 830
	Cabinet	RAV-083	Model 835
	Back Cover	RAB-091	Model 830
	Back Cover	RAB-092	Model 835
	Safety Glass	RDW-018	Model 830
	Safety Glass	RDW-019	Model 835
	Safety Glass	RDW-022	Model 840
	Knob	RDK-152	Vert. Hold and Contrast
	Knob	RDK-153	Hor. Hold and Brightness
	Knob	RDK-154	Focus, Tuning
	Knob	RDK-155	Channel Selector, On-Off Volume Models 830 and 835.
	Knob	RDK-156	Channel Selector, Volume Model 840
	Knob	RDK-157	On-Off Model 840(Gold Bar)
	Centering Ring	RHM-057	Model 840
	Centering Ring and Support Assembly	RAX-025	Model 830
	Centering Assembly	RAX-024	Model 835, includes Magnet Rings and Split Fiber Tube.

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA G. E. PART No.	REPLACEMENT DATA	NOTES
M2	Bayonet	6-8V	.25A	Blue	UDL-005		Type #44

RADIO **PARTS LIST AND DESCRIPTIONS**

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		G. E. PART No.	STANDARD REPLACEMENT		
V22	RF Amp.	6AG5	6AG5	7BD	
V23	Mixer	6AK5	6AK5	7BD	
V24	Oscillator	6AK5	6AK5	7BD	
V25	1st IF Amp.	6SG7	6SG7	8BK	
V26	2nd IF Amp.	6SV7	6SV7	7AZ	
V27	Det.-Limiter	6SV7	6SV7	7AZ	
V28	Disc.-1st AF Amp.	6AQ7GT	6AQ7GT	8CK	
V29	Tuning Indicator	6AL7GT	6AL7GT	8CH	
V30	Phono Pre-Amp.	6SC7	6SC7	8S	
V31	2nd AF Amp.	6SQ7	6SQ7	8Q	
V32	3rd AF Amp.-Phase Inv.	6SN7GT	6SN7GT	8BD	
V33A	Audio Output	6V6GT	6V6GT	7AC	
B	Audio Output	6K6GT	6K6GT	7S	Model 830 and 835 only.
V34	Audio Output	6V6GT	6V6GT	7AC	
V35	Audio Output	6V6GT	6V6GT	7AC	
V36	Audio Output	6V6GT	6V6GT	7AC	
V37	LV Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	
C94A	30	450	RCE-019	AF636J6B	UP9DJ674		TVL-58	▲ Filter
B	15	450					TVA-15	■ Filter
C	30	450						▲ Filter
D	30	50						Output Cath. Bypass
C95A	30	400	RCE-032	AF66J	UP3345		EL-240	▲ Decoupling
B	30	350						▲ Decoupling
C96	150	500	UCU-1532	1469-00015	5R5T15	NPO-334-150	MS-315	Fixed Trimmer
C97	6.8		UCN-506			NPOK-6.8		RF Coupling
C98	27		UCW-1014					Fixed Trimmer
C99	100		RCW-1028	1469-0001	5R5T1	NPOM-100	MS-31	Fixed Trimmer
C100	6.8		UCN-506			NPOK-6.8		RF Coupling
C101	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C102	.05	600	UCC-045	P688-05	GT6S5		TM-15	AVC Filter
C103	22		UCW-012	1468-000025	5W5Q25	GP1K-22	MS-425	RF Coupling
C104	47	500	UCU-520	1468-00005	5W5Q5	GP1K-47	1FM-45	RF Coupling
C105	.02	600	UCC-041	P688-02	GT6S2		TM-12	RF Plate Decoupling
C106	820	500	UCN-1550	1468-001	1W5D1	GP2L-001	1FM-21	RF Screen Bypass
C107	.02	600	UCC-041	P688-02	GT6S2		TM-12	RF Screen Decoupling
C108	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C109	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Conv. Plate Decoupling
C110	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	RF Coupling
C111	4.7		RCW-025	1468-000005	5W5V5	NPOK-4.7	MS-55	Osc. Coupling
C112	1.5		UCN-502			NPOK-1.5		Osc. Coupling
C113	10		UCW-1004	1468-00001	5W5Q1	GP1K-10	MS-41	Osc. Coupling
C114	10		UCW-1004	1469-00001	5R5Q1	GP1K-10	MS-41	Fixed Trimmer
C115	68		UCW-1024		5R5Q7	GP1K-68	MS-47	Fixed Trimmer
C116	180	500	UCG-3034					Fixed Trimmer
C117	4.7		UCN-505	1469-000005	5R5Q5	NPOK-4.7	MS-55	Fixed Trimmer
C118	10	500	UCU-1504	1469-00001	5R5Q1	NPOK-10	MS-41	Fixed Trimmer
C119	22	500	UCU-1512			GP1K-22		Fixed Trimmer
C120	4.7		RCW-025	1468-000005	5W5V5	NPOK-4.7	MS-55	Osc. Grid Cap.
C121	47		RCW-001	1468-00005	5W5Q5	GP1K-47	1FM-45	Osc. Grid Cap.
C122	22		UCW-012	1468-000025	5W5Q25	GP1K-22	MS-425	RF Bypass
C123	470	500	UCU-544	1468-0005	5W5T5	GP2K-470	1FM-35	Osc. Plate Bypass
C124	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C125	470	500	UCU-544	1468-0005	5W5T5	GP2K-470	1FM-35	Conv. Screen Bypass
C126	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Conv. Screen Bypass
C127	27		UCW-1014			GP1K-27		Fixed Trimmer
C128	470	500	UCU-544			GP2K-470		Fixed Trimmer
C129	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	AVC Filter
C130	220	500	UCU-536	1468-00025	5W5T25	GP2K-220	1FM-325	IF Coupling
C131	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Cathode Bypass
C132	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Screen Bypass
C133	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C134	27		UCW-1014			GP1K-27		Fixed Trimmer
C135	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	1st IF Plate Decoupling
C136	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Cathode Bypass
C137	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	2nd IF Plate Decoupling
C138	22	500	UCU-1512	1468-000025	5W5Q25	GP1K-22	MS-425	RF Filter
C139	22	500	UCU-1512	1468-000025	5W5Q25	GP1K-22	MS-425	RF Filter
C140	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Lim. Screen Bypass
C141	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Lim. Screen Decoupling
C142	47	500	UCU-520	1468-00005	5W5Q5	GP1K-47	1FM-45	Lim. Plate Decoupling
C143	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Lim. Plate Decoupling
C144	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	Squelch Filter
C145	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Squelch Coupling
C146	100		UCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	Diode Load Cap.
C147	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	De-emphasis
C148	.05	600	UCC-045	P688-05	GT6S5		TM-15	AVC Filter
C149	47	500	UCU-520	1468-00005	5W5Q5	GP1K-47	1FM-45	AF Plate Bypass
C150	47	500	UCU-520	1468-00005	5W5Q5	GP1K-47	1FM-45	AF Grid Bypass
C151	47	500	UCU-520	1468-00005	5W5Q5	GP1K-47	1FM-45	AF Cathode Bypass
C152	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C153	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C154	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Bias Filter
C155	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	RF Bypass
C156	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	Tuning Ind. Bypass
C157	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	Tuning Ind. Bypass
C158	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Tuning Ind. Plate Bypass
C159	.05	600	UCC-045	P688-05	GT6S5		TM-15	Phono Coupling
C160	.05	600	UCC-045	P688-05	GT6S5		TM-15	Phono Coupling
C161	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Phono Coupling
C162	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Phono Tone Comp.
C163	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C164	.02	600	UCC-041	P688-02	GT6S2		TM-12	Audio Coupling
C165	47	500	UCU-544	1468-00005	5W5Q5	GP1K-47	1FM-45	AF Plate Bypass
C166	470	500	UCU-544	1468-0005	5W5T5	GP2K-470	1FM-35	Tone Compensation

RADIO **PARTS LIST AND DESCRIPTIONS (Continued)**

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C167	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	Conv. Filament Bypass
C168	100		RCW-1028	1468-0001	5W5T1	GP1K-100	1FM-31	RF Filament Bypass
C169	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Lim. Filament Bypass
C170	100	500	UCU-028	1468-0001	5W5T1	GP1K-100	1FM-31	Line Ant. Coupling
C171	3.3		UCN-1504			NPOK-3.3		Osc. Coupling
C172	10	500	UCU-1504	1468-00001	5W5Q1	GP1K-10	MS-41	Osc. Coupling
C173	680	500	UCG-2048		2R5T7	GP2K-680	MS-37	Fixed Trimmer
C174	.02	600	UCC-041	P688-02	GT6S2		TM-12	Audio Coupling
C175	.01	600	UCC-040	P688-01	GT6S1	GP2-335-01	TM-11	Audio Coupling
C176	.001	600	UCC-035	P688-001	GT6D1	GP2L-001	TM-21	AF Plate Bypass
C177	.1	600	UCC-048	P688-1	GT6P1		TM-1	Tone Compensation
C178	.05	600	UCC-045	P688-05	GT6S5		TM-15	Audio Coupling
C179	.05	600	UCC-045	P688-05	GT6S5		TM-15	Audio Coupling
C180	.002	1000	UCC-056	P1088-002	GT16D2		MB-22	Output Plate Bypass

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R119A	2 Meg.	½	RRC-050			Volume Control (Dual Control)
B	2 Meg.	½				Volume Control
R120	100Ω	2	RRW-016	W-100	43-100	Hum Balance Control, Wire Wound

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA G. E. PART No.	IRC PART No.	IDENTIFICATION CODES
R121	1 Meg.	½	URD-121	BTS-1 Meg.	Ant. Isolation
R122	1.5 Meg.	½	URD-125	BTS-1.5 Meg.	RF Grid
R123	1000Ω	½	URD-049	BTS-1000	RF Screen
R124	100KΩ	½	URD-097	BTS-100K	RF Screen Decoupling
R125	10KΩ	1	URE-073	BTA-10K	RF Plate Decoupling
R126	1.5 Meg.	½	URD-125	BTS-1.5 Meg.	AVC Network
R127	1.5 Meg.	½	URD-125	BTS-1.5 Meg.	Mixer Grid
R128	100KΩ	½	URD-097	BTS-100K	Mixer Screen
R129	15KΩ	½	URD-077	BTS-15K	Mixer Plate Decoupling
R130	3.3 Meg.	½	URD-133	BTS-3.3 Meg.	Feedback
R131	33Ω	½	URD-013		Parasitic Supp.
R132	22KΩ	½	URD-081	BTS-22K	Osc. Grid
R133	220Ω	½	URD-033		Osc. Plate
R134	47KΩ	1	URE-089	BTA-47K	Voltage Divider
R135	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	AVC Network
R136	470KΩ	½	URD-113	BTS-470K	1st IF Grid
R137	220Ω	½	URD-033		1st IF Cathode
R138	4700Ω	½	URD-065	BTS-4700	1st IF Screen
R139	2200Ω	½	URD-057	BTS-2200	1st IF Plate Decoupling
R140	470KΩ	½	URD-113	BTS-470K	AVC Network
R141	470Ω	½	URD-041	BTS-470	2nd IF Cathode
R142	2200Ω	½	URD-057	BTS-2200	2nd IF Plate Decoupling
R143	100KΩ	½	URD-097	BTS-100K	AVC Network
R144	100KΩ	½	URD-097	BTS-100K	AVC Network
R145	68KΩ	½	URD-093	BTS-68K	RF Filter
R146	120KΩ	½	URD-099	BTS-120K	Limiter Screen
R147	2200Ω	½	URD-057	BTS-2200	Limiter Screen Decoupling
R148	22KΩ	½	URD-081	BTS-22K	Limiter Plate Decoupling
R149	2200Ω	½	URD-057	BTS-2200	Decoupling
R150	10KΩ	1	URE-073	BTA-10K	Squelch Network
R151	1 Meg.	½	URD-121	BTS-1 Meg.	Diode Load
R152	2.2 Meg.	½	URD-129	BTS-2.2 Meg.	Bias Network
R153	470KΩ	½	URD-113	BTS-470K	De-emphasis
R154	120KΩ	½	URD-099	BTS-120K	Disc. Diode Load
R155	120KΩ	½	URD-099	BTS-120K	Disc. Diode Load
R156	1 Meg.	½	URD-121	BTS-1 Meg.	AVC Network
R157	1000Ω	½	URD-049	BTS-1000	Tone Compensation
R158	100KΩ	½	URD-097	BTS-100K	1st AF Cathode
R159	2700Ω	½	URD-059	BTS-2700	1st AF Cathode
R160	1 Meg.	½	URD-121	BTS-1 Meg.	1st AF Grid
R161	1000Ω	½	URD-049	BTS-1000	Tone Compensation
R162	4700Ω	½	URD-065	BTS-4700	Tuning Indicator Cathode
R163	22KΩ	½	URD-081	BTS-22K	Phono Pick-up Load
R164	6800Ω	½	URD-069	BTS-6800	Phono Pick-up Load
R165	4.7 Meg.	½	URD-137	BTS-4.7 Meg.	Phono Pre Amp. Grid
R166	4.7 Meg.	½	URD-137	BTS-4.7 Meg.	Phono Pre Amp. Grid
R167	28KΩ	½	URD-095	BTS-82K	Phono Pre Amp. Plate
R168	82KΩ	½	URD-095	BTS-82K	Phono Pre Amp. Plate
R169	33KΩ	½	URD-085	BTS-33K	Phono Pre Amp. Decoupling
R170	470KΩ	½	URD-113	BTS-470K	Tone Compensation
R171	27KΩ	½	URD-083	BTS-27K	Tone Compensation
R172	180KΩ	½	URD-103	BTS-180K	Tone Compensation
R173	1 Meg.	½	URD-121	BTS-1 Meg.	Tone Compensation
R174	18KΩ	2	URF-079	BT-2-18K	Bleeder
R175	18KΩ	2	URF-079	BT-2-18K	Bleeder
R176	22KΩ	½	URD-081	BTS-22K	Tone Compensation
R177	8200Ω	2		BT-2-8200	Voltage Dropping
R178	22KΩ	½	URD-081	BTS-22K	Tone Compensation
R179	6.8 Meg.	½	URD-141	BTS-6.8 Meg.	2nd AF Grid
R180	100KΩ	½	URD-097	BTS-100K	2nd AF Plate
R181	680KΩ	½	URD-117	BTS-680K	Tone Compensation
R182	680KΩ	½	URD-117	BTS-680K	Tone Compensation
R183	47KΩ	½	URD-089	BTS-47K	Tone Compensation
R184	47KΩ	½	URD-089	BTS-47K	Tone Compensation
R185	8200Ω	2		BT-2-8200	Voltage Dropping
R186A	150Ω	6	RRT-001	AB-150	Output Cathode, Wire Wound
B	900Ω	6		AB-900	Filter, Wire Wound
R187	1 Meg.	½	URD-121	BTS-1 Meg.	3rd AF Grid
R188	1800Ω	½	URD-055	BTS-1800	3rd AF Cathode
R189	47KΩ	½	URD-089	BTS-47K	3rd AF Plate
R190	1 Meg.	½	URD-121	BTS-1 Meg.	Phase Inv. Grid
R191	2700Ω	½	URD-059	BTS-2700	Phase Inv. Cathode
R192	33KΩ	½	URD-085	BTS-33K	Phase Inv. Cathode
R193	33KΩ	½	URD-085	BTS-33K	Phase Inv. Plate
R194	220Ω	½	URD-033	BW-½-220	Tone Compensation

RADIO **PARTS LIST AND DESCRIPTIONS (Continued)**

RESISTORS (CONT.)

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	G. E. PART No.	IRC PART No.	
R195	18KΩ	½	URD-079	BTS-18K	Feedback
R196	1000Ω	½	URD-049		Parasitic Supp.
R197	220KΩ	½	URD-105	BTS-220K	Output Grid
R198	100Ω	½	URD-025		Parasitic Supp.
R199	1000Ω	½	URD-049		Parasitic Supp.
R200	100Ω	½	URD-025		Parasitic Supp.
R201	1000Ω	½	URD-049		Parasitic Supp.
R202	220KΩ	½	URD-105	BTS-220K	Output Grid
R203	100Ω	½	URD-025		Parasitic Supp.
R204	1000Ω	½	URD-049		Parasitic Supp.
R205	100Ω	½	URD-025		Parasitic Supp.
R206	5600Ω	1	URE-067	BTA-5600	Tone Compensation

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	G. E. PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L37	.175A	120Ω	7 Henries	RLF-010	C-1410	C-3196	R-7200	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	G. E. PART No.	MEISSNER PART No.	
L38	AM Loop Ant.	0Ω		RAB-085		Includes back cover.
L39	BC Ant. Trans.	40Ω	3Ω & .2Ω	RLA-006		Push-button
L40	BC Ant. Trans.	.5Ω	6Ω	RLA-009		
L41	FM Wave Trap	.8Ω		RLP-008		
L42	FM Ant.	0Ω		RHM-026		Tuner Frame -two required to make one inductance
L43	FM Ant. Chk.	1Ω		RLA-012		
L44	BC RF Coil	1Ω				1000-1600KC } Part of M14
L45	BC RF Coil	1Ω				850-1520KC } Part of M14
L46	BC RF Coil	1Ω				850-1520KC } Part of M14
L47	BC RF Coil	1Ω				500-1050KC } Part of M14
L48	BC RF Coil	1Ω				500-1050KC } Part of M14
L49	BC RF Coil	1Ω				500-1050KC } Part of M14
L50	SW Loop Shunt	0Ω		RLI-018		
L51	FM Plate Choke	.8Ω		RLP-008		
R52	FM RF Coil	0Ω		RHM-026		Tuner frame-two required to make one inductance
R53	SW RF Coil	0Ω		RLC-017		
L54	SW Plate Choke	1Ω		RLB-008		
L55	BC Plate Choke	1Ω		RLB-009		
L56	BC RF Trans.	.5Ω	6Ω	RLB-006		
L57	BC Osc. Shunt	3.5Ω		RLC-014		
L58	BC Osc. Coil	3.5Ω		RLC-016		
L59	FM Osc. Coil	0Ω		RHM-027		Tuner frame-two required to make one inductance
L60	FM RF Chk.	.1Ω		RLI-005		
L61	FM RF Chk.	.9Ω		RLA-012		
L62	SW Osc. Coil	0Ω		RLC-015		
L63	FM RF Choke	.3Ω		RLP-005		
L64	FM RF Choke	.3Ω		RLP-005		
L65	1st IF FM	*4Ω	.2Ω	RTL-017		
	AM		6Ω			
L66	2nd IF FM	.2Ω	.2Ω	RTL-022		
	AM	.5Ω	.5Ω			
L67	3rd IF FM	8Ω	♦8Ω	RTL-043		
	AM	.2Ω				
L68	Disc. Trans	1Ω	1Ω	RTD-001		
L69	Fil. Choke	.1Ω		RLF-007		
L70	FM Line Choke	0Ω		RLI-002		

* Includes both primaries
♦ Includes both secondaries

DIAL LIGHTS

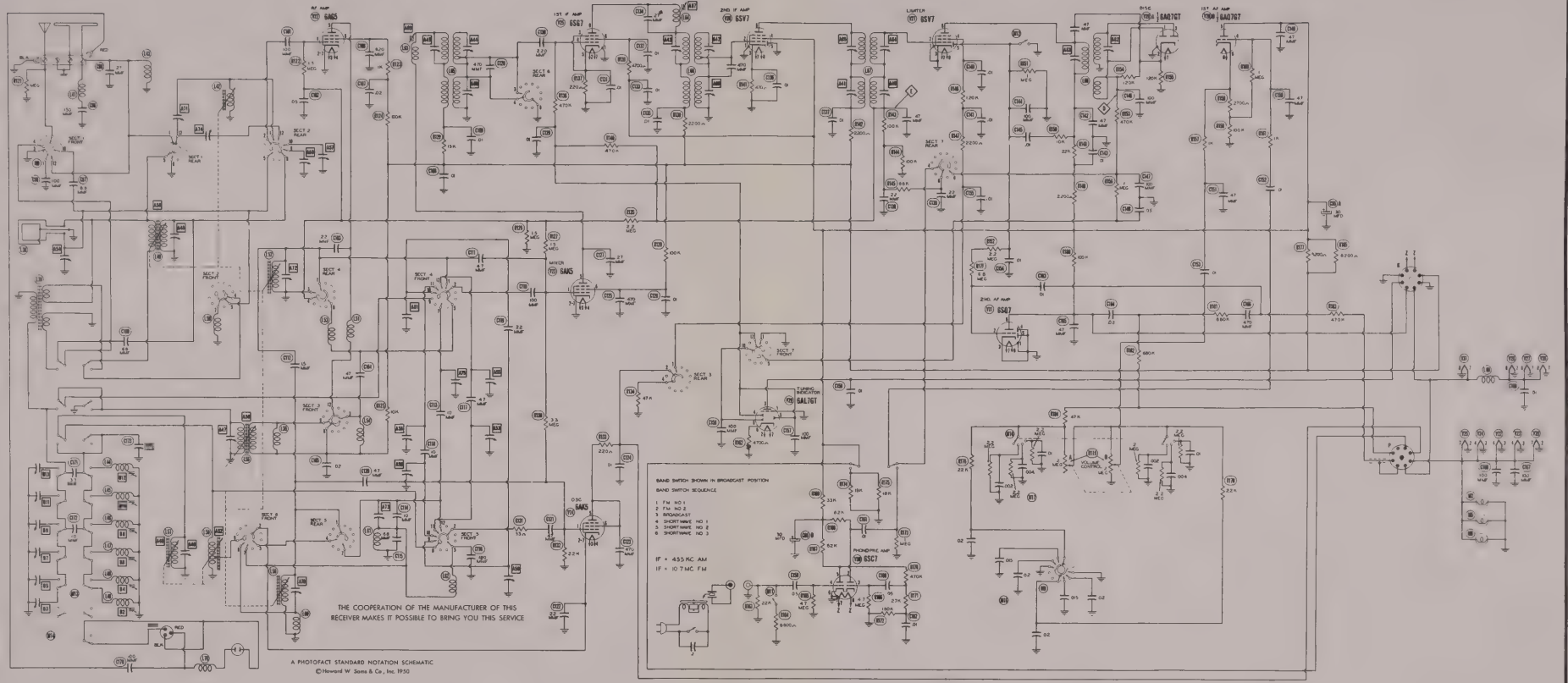
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					G. E. PART No.		
M5	Bayonet	6-8V	.25A	Blue	UDL-005		Type #44
M6	Bayonet	6-8V	.15A	Brown	UDL-008		Type #47

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	G. E. PART No.	ASTATIC PART No.	
M7	RPX-044		

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M8	Band Switch	RSW-029	
M9	Bass Tone Switch	RSW-017	
M10	Treble Tone Switch	RSW-016	
M11	Phono Switch		Normal-Extended High Frequency
M12	Squelch Switch	RSS-003	
M13	Push-Button Switch	RSP-004	Switch only. Includes On-Off Switch
M14	Push-Button Assembly	RDX-020	Includes Coils and Trimmers
M15	Fuse		5A
M16	Tone Cont. Assembly	RRC-026	Bass
M17	Tone Cont. Assembly	RRC-027	Treble


BAND SWITCH SHOWN IN BROADCAST POSITION
BAND SWITCH SEQUENCE
1. FM NO 1
2. FM NO 2
3. BROADCAST
4. SHORT WAVE NO 1
5. SHORT WAVE NO 2
6. SHORT WAVE NO 3
IF = 455 KC AM
IF = 10.7 MC FM
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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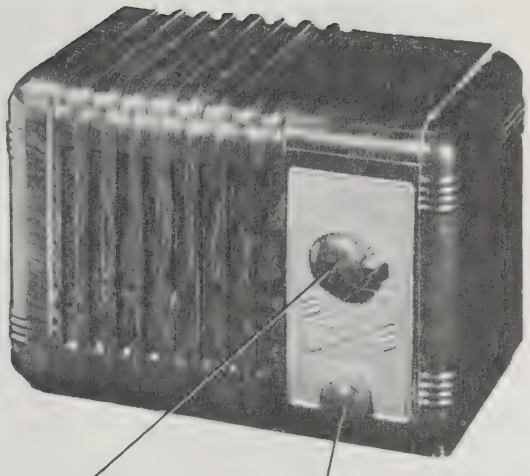
MECK
MODELS DA601, DB6021

MODEL DB 602 I



MODEL DA 601

MECK
MODELS DA601, DB6021

TRADE NAME	Meck, Model DA601, DB602I
MANUFACTURER	John Meck Industries, Plymouth, Indiana
TYPE SET	AC-DC Operated TRF Receiver
TUBES (FOUR)	Types 12BA6 or 12SG7 RF Amp., 12AT6 or 12SQ7 DET-AVC-AF, 50C5 or 50B5 or 50L6GT Power Output, 35W4 or 35Z5GT PRectifier
POWER SUPPLY	110-120 Volts AC-DC RATING: .26 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	535-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	50MMF	High side to ant. lug on antenna coil. Low side to chassis. (Remove hank ant.)	1400KC (400 ~ Mod.)	Tune for maximum output.	Across voice coil	A1, A2	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MECK PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1A	RF Amp.	12BA6	12BA6	7BK	
B	RF Amp.	12SG7	12SG7	8BK	
V2A	DET.-AF Amp.	12AT6	12AT6	7BT	
B	DET.-AF Amp.	12SQ7GT	12SQ7GT	8Q	
V3A	Power Output	50C5	50C5	7CV	
B	Power Output	50B5	50B5	7BZ	
C	Power Output	50L6GT	50L6GT	7AC	
V4A	Rectifier	35W4	35W4	5BQ	
B	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MECK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	CL-10017	PRSA150/50-30	EDL5315		TA-530	Filter Red
B	30	150						Filter Blue
C2	.0025	1400	CP-12202	P688-0022	PTE6D2	GP2M-0025	TM-22	Audio Coupling
C3	.005	600	CP-12502	P688-005	PTE6D5	GP2M-005	TM-25	Audio Coupling
C4	.01	600	CP-12103	P688-01	PTE6S1	GP2-335-01	TM-11	Output Plate Bypass
C5	.02	400		P488-02	PTE4S2		TM-12	Line Filter

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MECK PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	VC-12106	Q11-137		Volume control
B	Switch		Not Req.	76-1		Attach to R1A per instructions

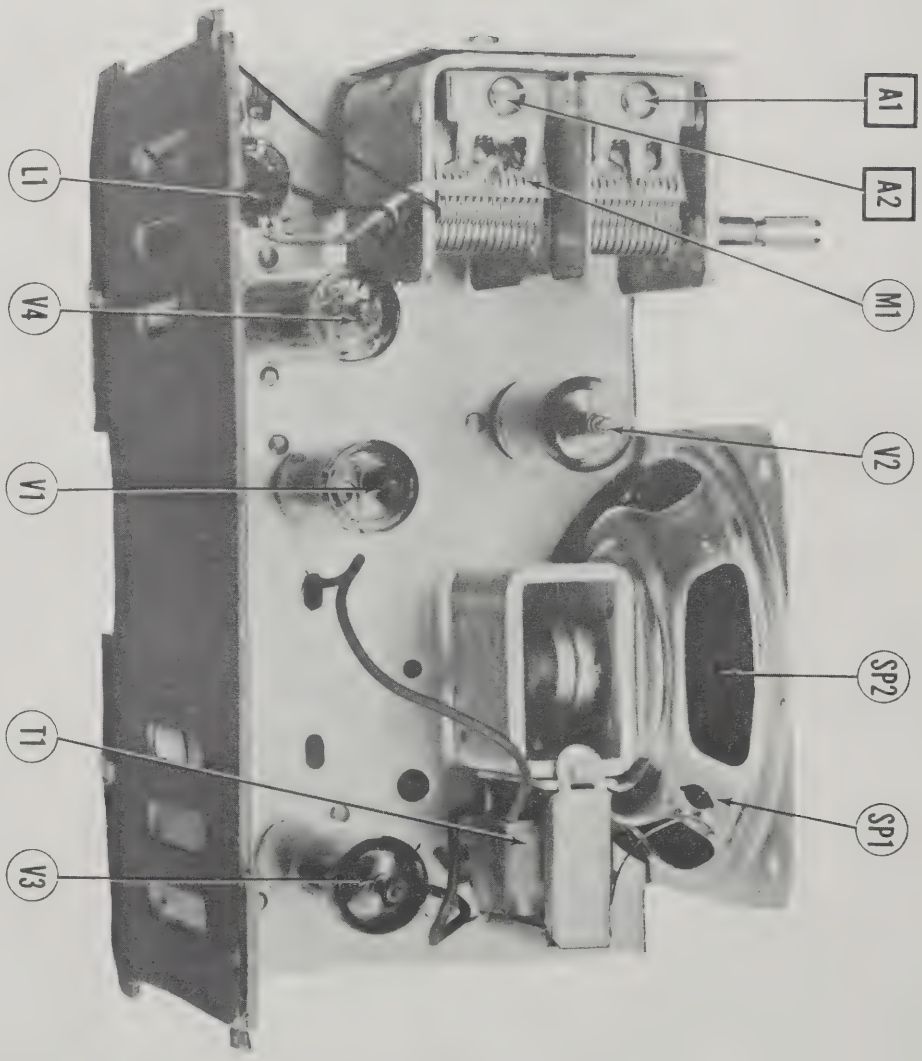
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MECK PART No.	IRC PART No.	IDENTIFICATION CODES
R2	82Ω	½		BW-½-82	RF Cathode
R3	100KΩ	½	RC-11003	BTS-100K	Diode Load
R4	10 Meg.	½	RC-11005	BTS-10 Meg.	AF Grid
R5	470KΩ	½	RC-14703	BTS-470K	AF Plate
R6	470KΩ	½	RC-14703	BTS-470K	Output Grid
R7	150Ω	½	RC-11500	BW-½-150	Output Cathode
R8	2000Ω	½		BTS-2000	Filter
R9	22Ω	1		BW-1-22	Line Dropping
R10	47Ω	1		BW-1-47	Filament Dropping

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: MECK PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	2KΩ	3.3Ω	146Ω	.9Ω	TO-10000	A-3332 †	A-3025 †	RO-1A †	† Bend mounting tabs down and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA MECK PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.				
SP1	PM	3.3Ω	SR-1000S		3A07 *	* Remount output transformer.
	CONE DIA.	V. C DIA.				
SP2	3 3/8"	9/16"				

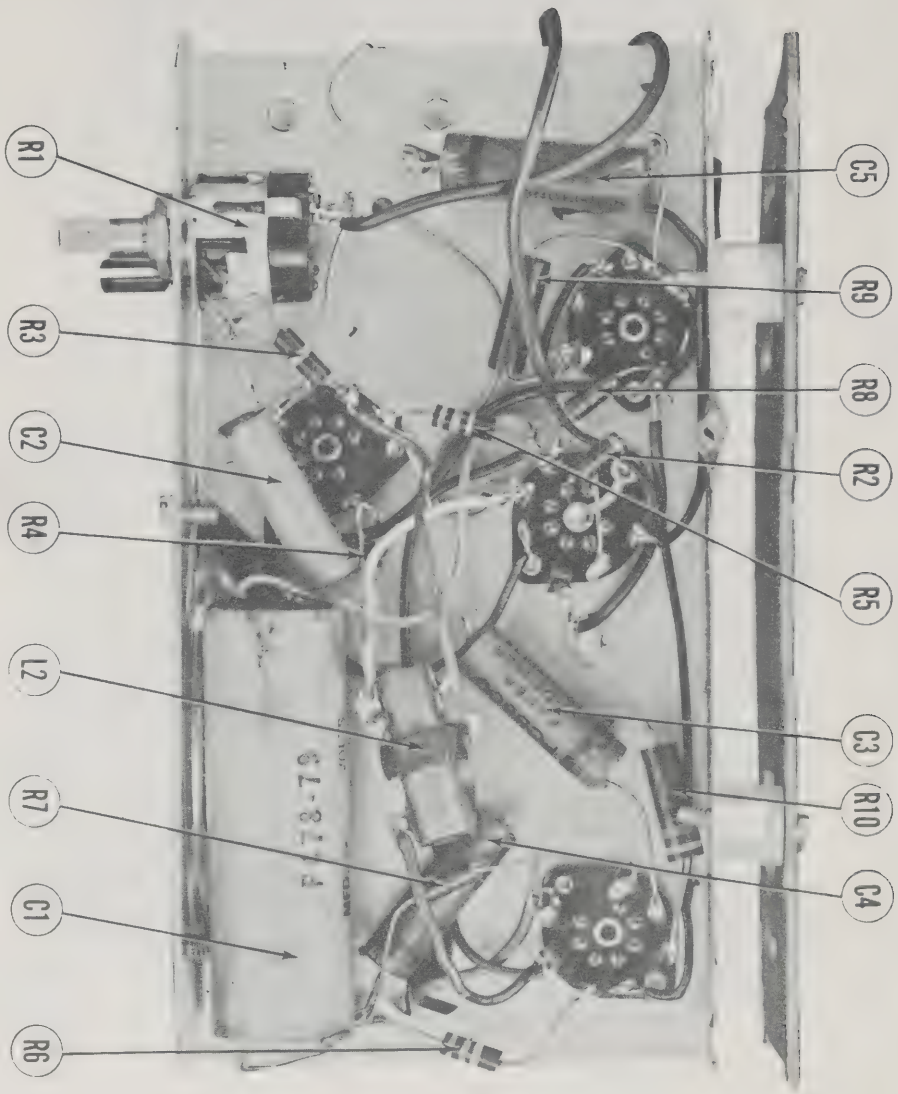
R F COILS

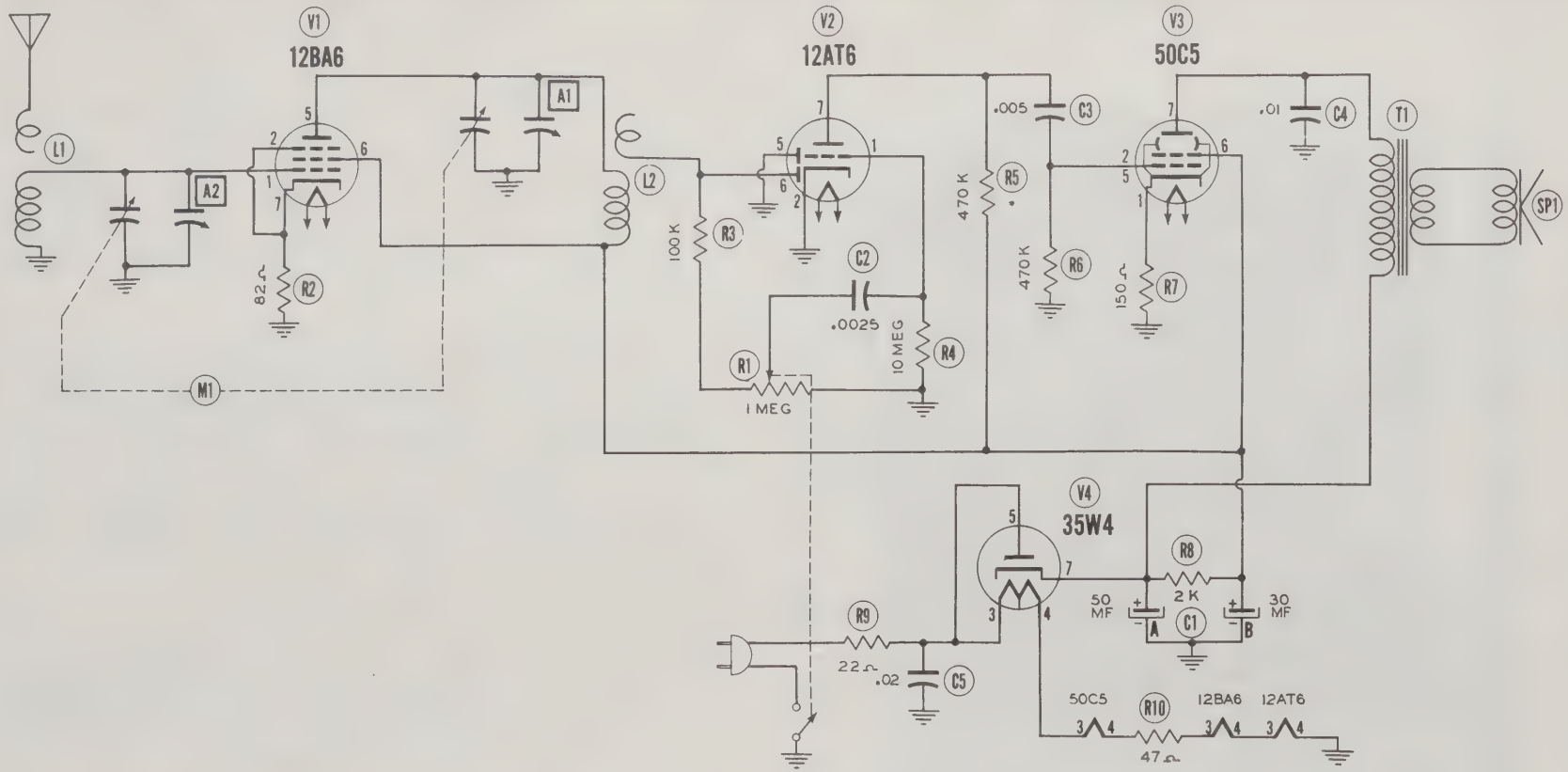
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MECK PART No.	REPLACEMENT DATA MEISSNER PART No.	
L1	Ant. Coil	4.8Ω		TRF10017-A		
L2	RF Coil	4.8Ω		TRF10011-B		

MISCELLANEOUS

ITEM No.	PART NAME	MECK PART No.	NOTES
M1	2 Gang. Var. Cap.		(32-474MMF) Each Section

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	0V.	1VDC	25VAC	12VAC	85VDC	85VDC	1VDC
V 2	12AT6	-.7VDC	0V.	12VAC	0V.	0V.	-.3VDC	40VDC
V 3	50C5	5.7VDC	0V.	33VAC	83VAC	0V.	95VDC	120VDC
V 4	35W4	117VAC	0V.	83VAC	115VAC	115VAC	107VAC	125VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	4.8Ω	68Ω	24Ω	12Ω	†2KΩ	†2KΩ	68Ω
V 2	12AT6	10 Meg.	0Ω	12Ω	0Ω	0Ω	1.1 Meg.	†470KΩ
V 3	50C5	150Ω	470KΩ	72Ω	120Ω	470KΩ	†2KΩ	†130Ω
V 4	35W4	180Ω	INF	120Ω	155Ω	155Ω	150Ω	60KΩ

† Measured from pin 7 of V4.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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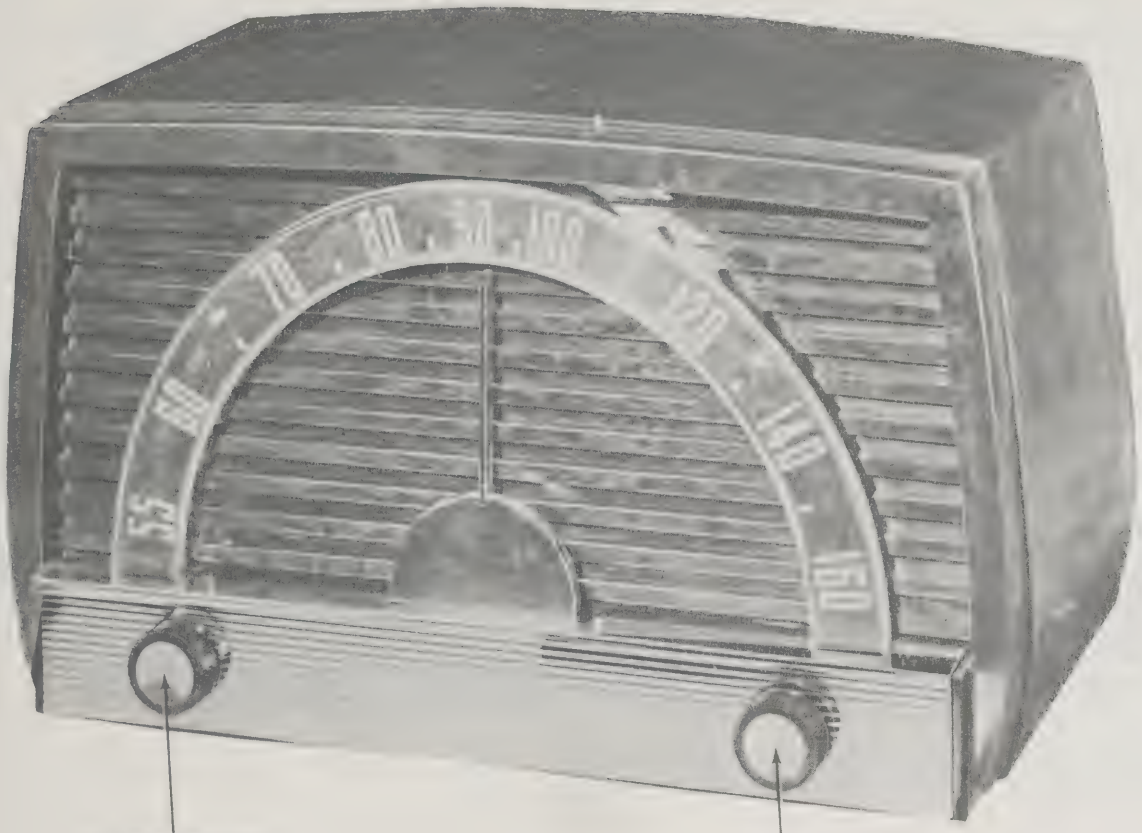
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MOTOROLA
MODELS 59X11, 59X12I (Ch. HS-180)



MOTOROLA
MODELS 59X11, 59X12I (Ch. HS-180)

MOTOROLA MODEL 59X11

TRADE NAME	Motorola, Models 59X11, 59X12I (Ch. HS-180)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 DET-AVC-AF, 50C5 Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC — RATING: .26 Amp. at 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low frequency end of dial.

Use isolation transformer if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to rear stator of tuning gang. Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC (400 ~ Mod.)	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC (400 ~ Mod.)	Tune for max. signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 59X11

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	DET.-AVC-AF	12AT6	12AT6	7BT	
V4	Power Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	23K482857	PRS150/30-50	EDL-5315		TA-530	Filter Red
B	30	150						Filter Green
C2	.05	200	8S9821	P288-05	GT2S5		TM-15	AVC Filter
C3A	220			1468-00025	5W5T25	GP2K-220		Diode RF Filter
B	2000		21B482847	P688-002	GT6D2	GP2M-002	34C3	Audio Coupling
C	220			1468-00025	5W5T25	GP2K-220		AF Plate Bypass
D	5000			P688-005	GT6D5	GP2M-005		Audio Coupling
C4	.02	400	8S9802	P488-02	GT4S2		TM-12	Output Plate Bypass
C5	.25	50	8A470504	P488-25	GT2P25		TC-2	Tone Compensation
C6	.05	400	8S9816	P488-05	GT4S5		TM-15	Line Filter

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA IRC PART No.	REPLACEMENT DATA CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	18A70032	Q13-137		Volume Control
B	Switch		Not Req.	76-1		Attach to R1A Per Instructions

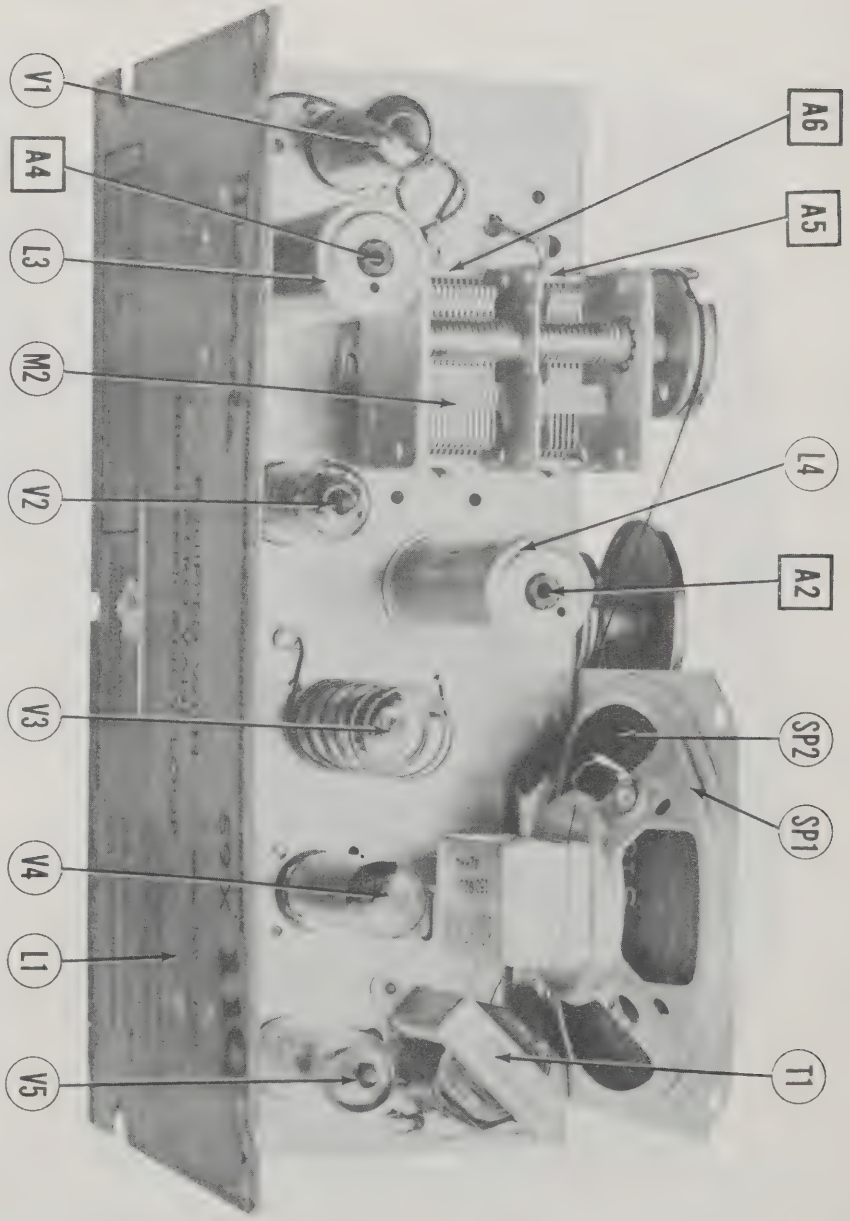
RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R2	22KΩ	½	6R6028	BTS-22K	Osc. Grid
R3	100Ω	½	6R6018	BW-½-100	IF Cathode
R4	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	AVC Network
R5	100Ω	½	6R6018	BTS-½-1500	AF Cathode
R6	10 Meg.	½	6R2109	BTS-10 Meg.	AF Grid
R7	470KΩ	½	6R6032	BTS-470K	AF Plate
R8	1500Ω	2	6R6161	BTS-1500	Tone Compensation
R9	1500Ω	½	6R6161	BTS-1500	Tone Compensation
R10	470KΩ	½	6R6032	BTS-470K	Output Grid
R11	150Ω	½	6R3992	BW-½-150	Output Cathode
R12	1000Ω	1	6R3953	BW-1-1000	Filter
R13	27Ω	½	6R5683		Surge Limiter

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T1	2300Ω	3.2Ω	178Ω	.4Ω	25K485973	A-3332	A-3025	R0-2 †	† Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-113		
SP1	PM	3.2Ω	50C478138	MOD. P4-X	4A07	
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

R F COILS

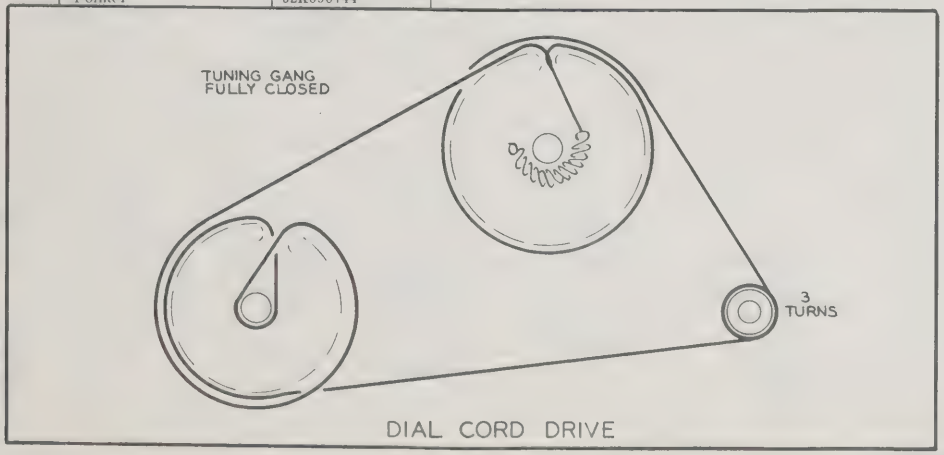
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MOTOROLA PART No.	MEISSNER PART No.	
L1	Loop Ant.	3.6Ω		24K690657		Includes back panel
L2	Osc. Coil	13Ω		24K482855	14-1060 *	* Add 50MMF from Osc. Grid to high side of tuning cap.
L3	Input IF	14.5Ω	14.5Ω	24B482863	16-6678	
L4	Output IF	14.5Ω	14.5Ω	24B482865	16-6678	

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA MOTOROLA PART No.		NOTES
M1	Bayonet	6-8	.15	Brown	65K11854		Type #47

MISCELLANEOUS

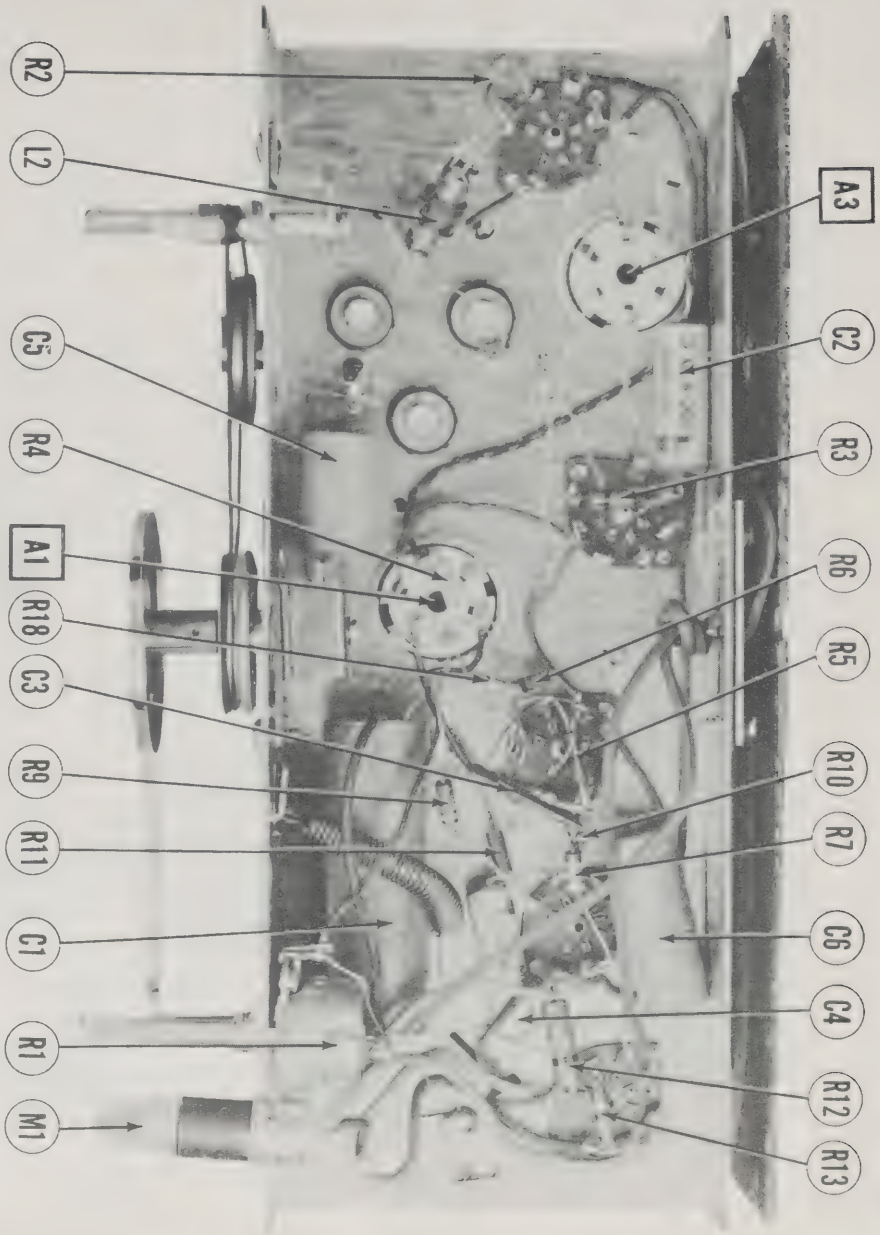
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M2	2 Gang Var. Cap.	1X690759	(26-392MMF, 14-105MMF)
	Cabinet	18E690504	Model 59X11 (Mahogany)
	Cabinet	16K690659	Model 59X12I (Ivory)
	Knob	36K690668	Mahogany
	Knob	36K690669	Ivory
	Dial Scale	34C690662	
	Pointer	52K690744	



DIAL CORD DRIVE

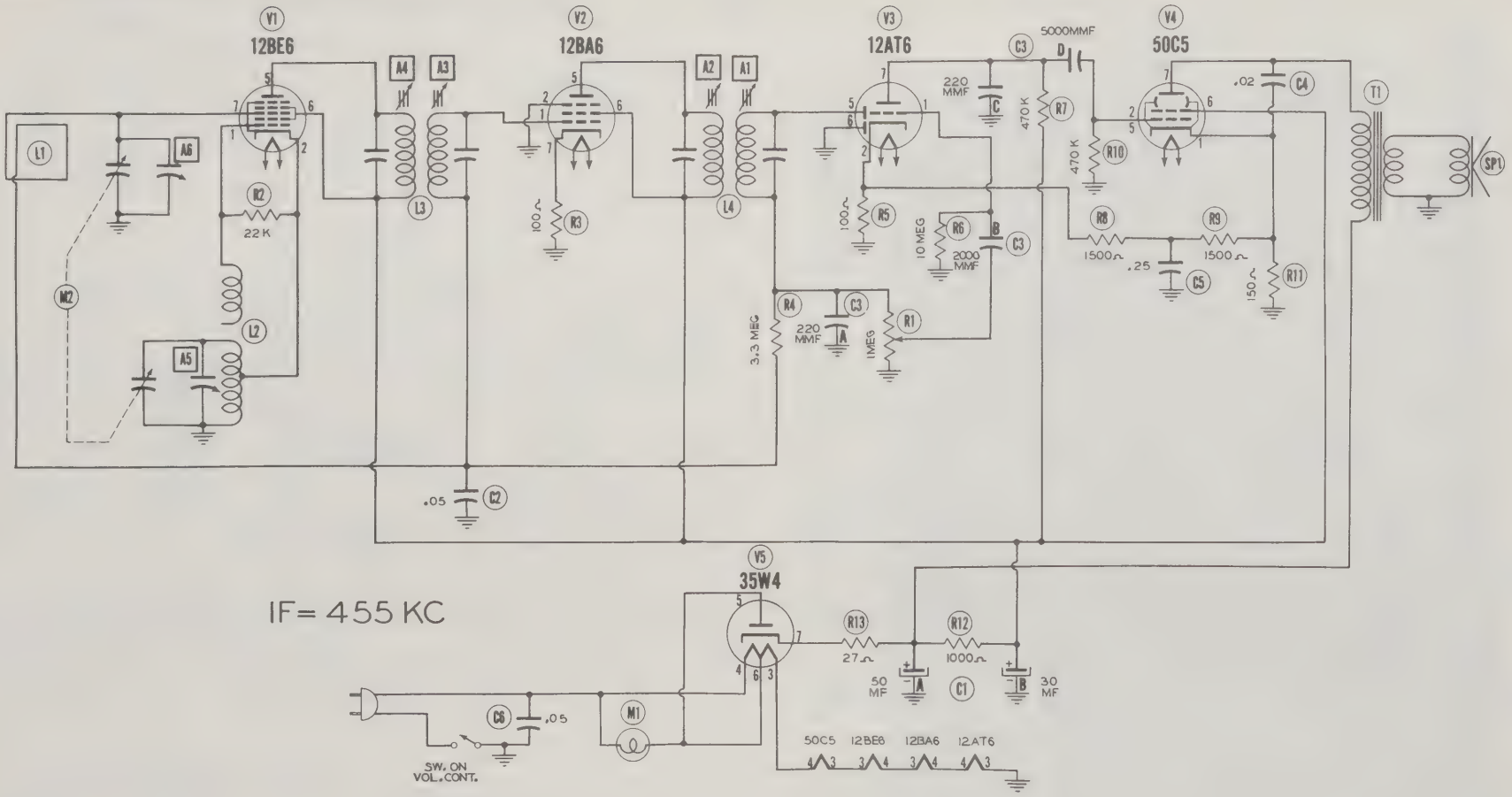
SET 81 FOLDER 11

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 59X11

MOTOROLA MODEL 59X11



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	§-6.8VDC	0V.	37VAC	25VAC	93VDC	93VDC	-.2VDC
V 2	12BA6	-.1VDC	0V.	25VAC	12VAC	93VDC	93VDC	1.1VDC
V 3	12AT6	-.4VDC	.2VDC	0V.	12VAC	-.3VDC	0V.	40VDC
V 4	50C5	6.2VDC	.1VDC	.37VAC	86VAC	.1VDC	93VDC	107VDC
V 5	35W4	115VDC	0V.	86VAC	117VAC	113VAC	113VAC	117VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	36Ω	24Ω	†1000Ω	†1000Ω	4.3 Meg.
V 2	12BA6	4.3 Meg.	0Ω	24Ω	12Ω	†1000Ω	†1000Ω	100Ω
V 3	12AT6	10 Meg.	100Ω	0Ω	12Ω	1 Meg.	0Ω	†470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	†1000Ω	†190Ω
V 5	35W4	7.5Ω	INF	86Ω	115Ω	115Ω	112Ω	70KΩ

† Measured from pin 7 of V5.

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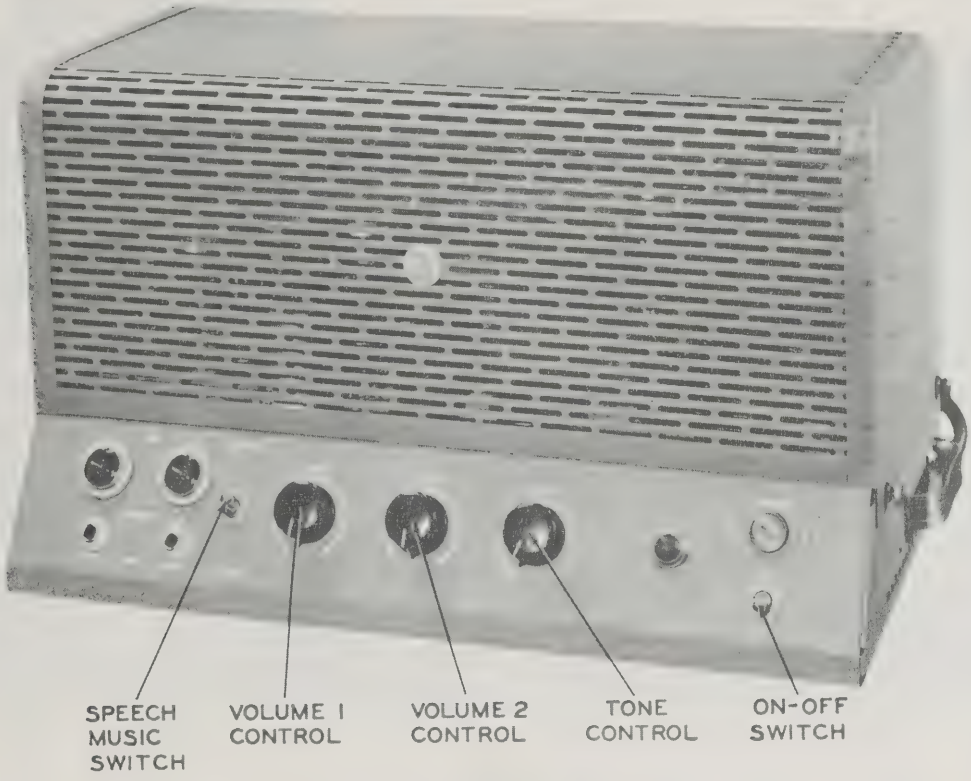
81-11

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RCA VICTOR
MODELS MI-12224, MI-12224A



RCA VICTOR
MODELS MI-12224, MI-12224A

RCA VICTOR MODEL MI-12224

TRADE NAME	RCA Victor, Models MI-12224, MI-12224-A
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, New Jersey
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES(EIGHT)	Types 6J7 Mic. 1 Pre Amp., 6J7 Mic. 2 Pre Amp., 6J7 1st AF Amp., 6C5 2nd AF Amp., 6C5 Phase Inverter, (2) 6L6 Power Output, 5U4G Rectifier
POWER SUPPLY	105-125 or 210-250 Volts AC RATING 1.27 Amp. at 117 Volts AC

AUDIO OUTPUT CONNECTIONS

The output transformer is tapped for load impedance of 250, 60, 15, 7½ and 4 ohms and the taps brought out to a marked terminal board on the back of the amplifier.

The following load impedance can be matched by making connections to the terminals as indicated in the table below:

TERMINALS	IMPEDANCE
4 - 7.5	0.5Ω*
7.5 - 15	1.2Ω*
4 - 15	3.3Ω*
0 - 4	4.0Ω
0 - 7.5	7.5Ω
0 - 15	15Ω
7.5 - 60	26Ω
4 - 60	34Ω
0 - 60	60Ω
15 - 250	145Ω
7.5 - 250	170Ω
4 - 250	192Ω
0 - 250	250Ω

*Use only for light loads, such as for monitoring purposes.

INPUT CONNECTIONS

"Phono 1" jack is provided for the connection of any standard magnetic pickup to channel No.1.
"Phono 2" jack is provided for the connection of any standard crystal pickup to channel No.2.
Michrophone plugs are provided for connecting microphones to either channel 1 or channel 2 or to both channels.

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL MI-12224

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA RCA PART No.	REPLACEMENT DATA STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mic. 1 Pre Amp.	6J7	6J7	7R	
V2	Mic. 2 Pre Amp.	6J7	6J7	7R	
V3	1st AF Amp.	6J7	6J7	7R	
V4	2nd AF Amp.	6C5	6C5	6Q	
V5	Phase Inverter	6C5	6C5	6Q	
V6	Power Output	6L6	6L6	7AC	
V7	Power Output	6L6	6L6	7AC	
V8	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	30	450	34065	AF6J	UP3045		EL-3	Filter
C2	30	450	34065	AF6J	UP3045		EL-3	Filter
C3A	20	350	18530	AF64H	UP2235		EL-32	■ Filter
B	20	350						▲ Decoupling
C4	16	150	31323	PRS150/16	BR1615		UT-161	Bias Filter
C5A	20	25	34061	AF88A	UP22-25		EL-242	▲ 1st AF Cath. Bypass
B	20	25						■ Phase Inv. Cath. Bypass
C6A	20	25	34061	AF88A	UP44-25		EL-242	▲ Input #1 Cath. Bypass
B	20	25						■ Input #2 Cath. Bypass
C7	.1	400	4839	P488-1	GT4P1		TM-1	Input #1 Screen Bypass
C8	.05	400	30847	P488-05	GT4S5		TM-15	Audio Coupling
C9	.1	400	4839	P488-1	GT4P1		TM-1	Input #2 Screen Bypass
C10	.05	400	30847	P488-05	GT4S5		TM-15	Audio Coupling
C11	.05	400	30847	P488-05	GT4S5		TM-15	Audio Coupling
C12	1000	500	35406	1467-001	1W5D1	GP2L-001	1FM-21	Tone Compensation
C13	1800	500	35407			GP2M-0018		Tone Compensation
C14	.01	600	4858	P688-01	GT6S1	GP2-335-01	TM-11	2nd AF Cath. Bypass
C15	.1	400	4839	P488-1	GT4P1		TM-1	Audio Coupling
C16	.05	400	30847	P488-05	GT4S5		TM-15	Audio Coupling
C17	.1	400	4839	P488-1	GT4P1		TM-1	Audio Coupling
C18	390	500	13894	1468-0004	5W5T4	GP2K-390	1FM-34	Output Grid Bypass
C19	.0025	1200	30850	P1688-0022	GT16D25		MB-22	Tone Compensation
C20	.015	400	11315	P488-015	GT6S15			AF Feedback

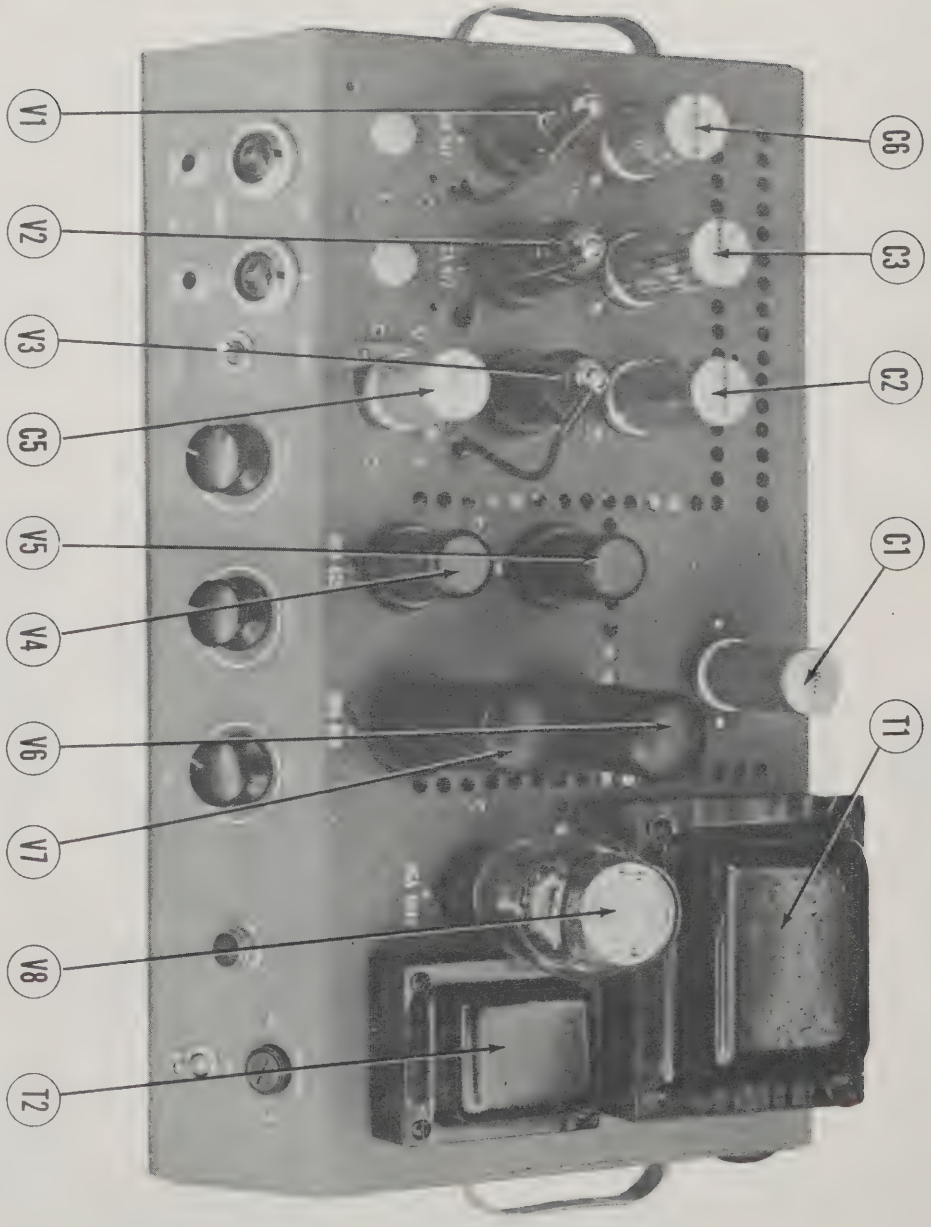
CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1	500KΩ	1/2	35473	Q13-133	M-60-Z	Volume 1 control
R2	500KΩ	1/2	35473	Q13-133	M-60-Z	Volume 2 control
R3	1 Meg.	1/2	35474	Q13-137	M-63-Z	Tone control

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA RCA PART No.	IRC PART No.	IDENTIFICATION CODES
R4	220KΩ	1/2	14583	BTS-220K	Input #1 Grid
R5	2200Ω	1/2	34767	BTS-2200	Input #1 Grid
R6	1800Ω	1/2	30930	BTS-1800	Input #1 Cathode
R7	1.2 Meg.	1/2	30162	BTS-1.2 Meg.	Input #1 Screen
R8	270KΩ	1/2	30651	BTS-270K	Input #1 Plate
R9	220KΩ	1/2	14583	BTS-220K	Input #2 Grid
R10	1800Ω	1/2	30930	BTS-1800	Input #2 Cathode
R11	1.2 Meg.	1/2	30162	BTS-1.2 Meg.	Input #2 Screen

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RCA PART No.	IRC PART No.	
R12	270KΩ	½	30651	BTS-270K	Input #2 Plate
R13	470KΩ	½	30648	BTS-470K	Tone Compensation
R14	470KΩ	½	30648	BTS-470K	Isolation
R15	470KΩ	½	30648	BTS-470K	Isolation
R16	1.2 Meg.	½	30162	BTS-1.2 Meg.	1st AF Grid
R17	1500Ω	½	30654	BTS-1500	1st AF Cathode
R18	82KΩ	½	8064	BTS-82K	1st AF Plate
R19	12KΩ	1	30866	BTA-12K	Decoupling
R20	1 Meg.	½	30652	BTS-1 Meg.	Tone Compensation
R21	270KΩ	½	30651	BTS-270K	2nd AF Grid
R22	2200Ω	½	34767	BTS-2200	2nd AF Cathode
R23	82KΩ	½	8064	BTS-82K	2nd AF Plate
R24	2200Ω	½	34767	BTS-2200	Phase Inv. Cathode
R25	680KΩ	½	30562	BTS-680K	Phase Inv. Grid
R26	82KΩ	½	8064	BTS-82K	Phase Inv. Plate
R27	100KΩ	½	3252	BTS-100K	Output Grid
R28	10KΩ	½	3078	BTS-10K	Output Grid
R29	100KΩ	½	3252	BTS-100K	Output Grid
R30	82KΩ	½	8064	BTS-82K	Feedback
R31	12KΩ	2	8073	BT-2-12K	Tone Compensation
R32A	2300Ω	50	34606	DG-2250	Filter (Wire Wound)
B	6400Ω	50	34606	EP-6000	Bleeder (Wire Wound)
R33	12KΩ	½	30436	BTS-12K	Bias Network
R34	140Ω	10	45458	AB-150	Bias Filter (Wire Wound)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC at 1.27A	750VCT .170ADC	5VAC at 3A	6.3VAC at 3.5A	45463	P-6165 †	P-2955 †	PH-200

† Add series resistor to reduce plate voltage.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RCA PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T2	8KΩ CT	250Ω 60Ω 15Ω 7.5Ω 4Ω	310Ω CT	15Ω 5.5Ω 1.2Ω .9Ω .7Ω	34519	A-3801 *	A-3130 *		* Drill new mounting holes.

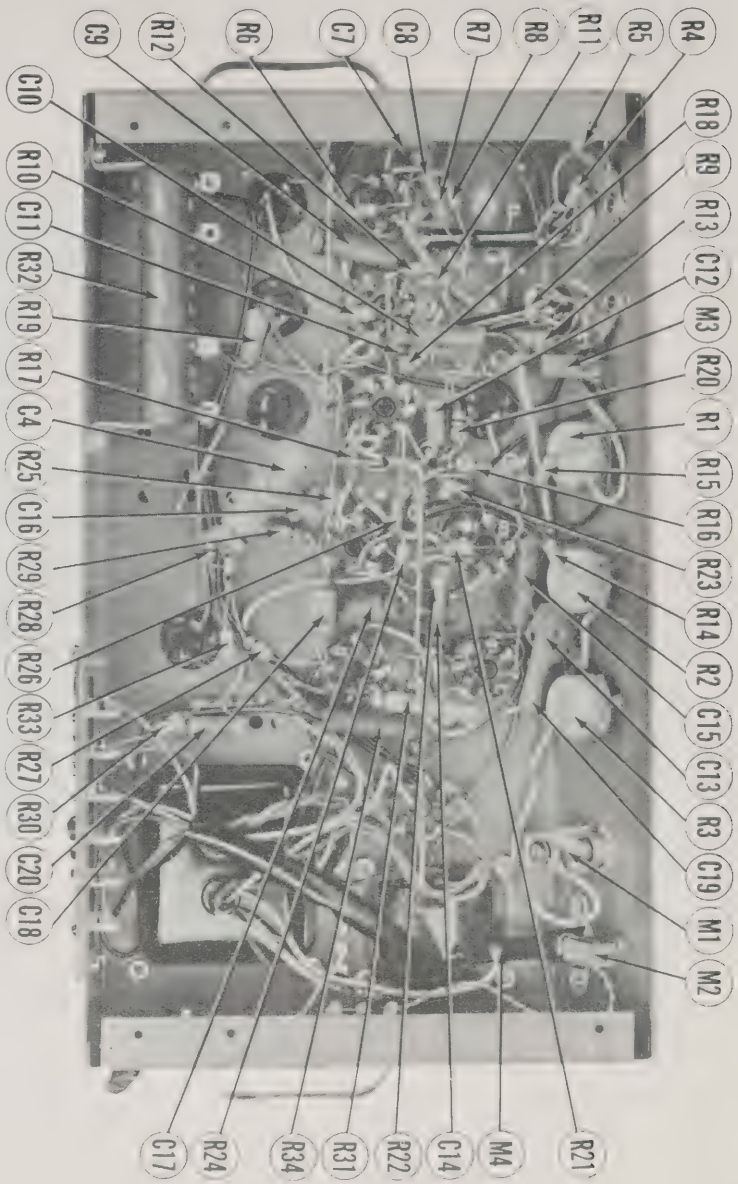
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					RCA PART No.		
M1	Bayonet	6-8	.25	Blue	11891		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	RCA PART No.	NOTES
M2	Switch	7900	On-Off
M3	Switch		Music-Speech
M4	Fuse	10907	3 Amp. AGC
	Knob	30075	

CHASSIS—BOTTOM VIEW

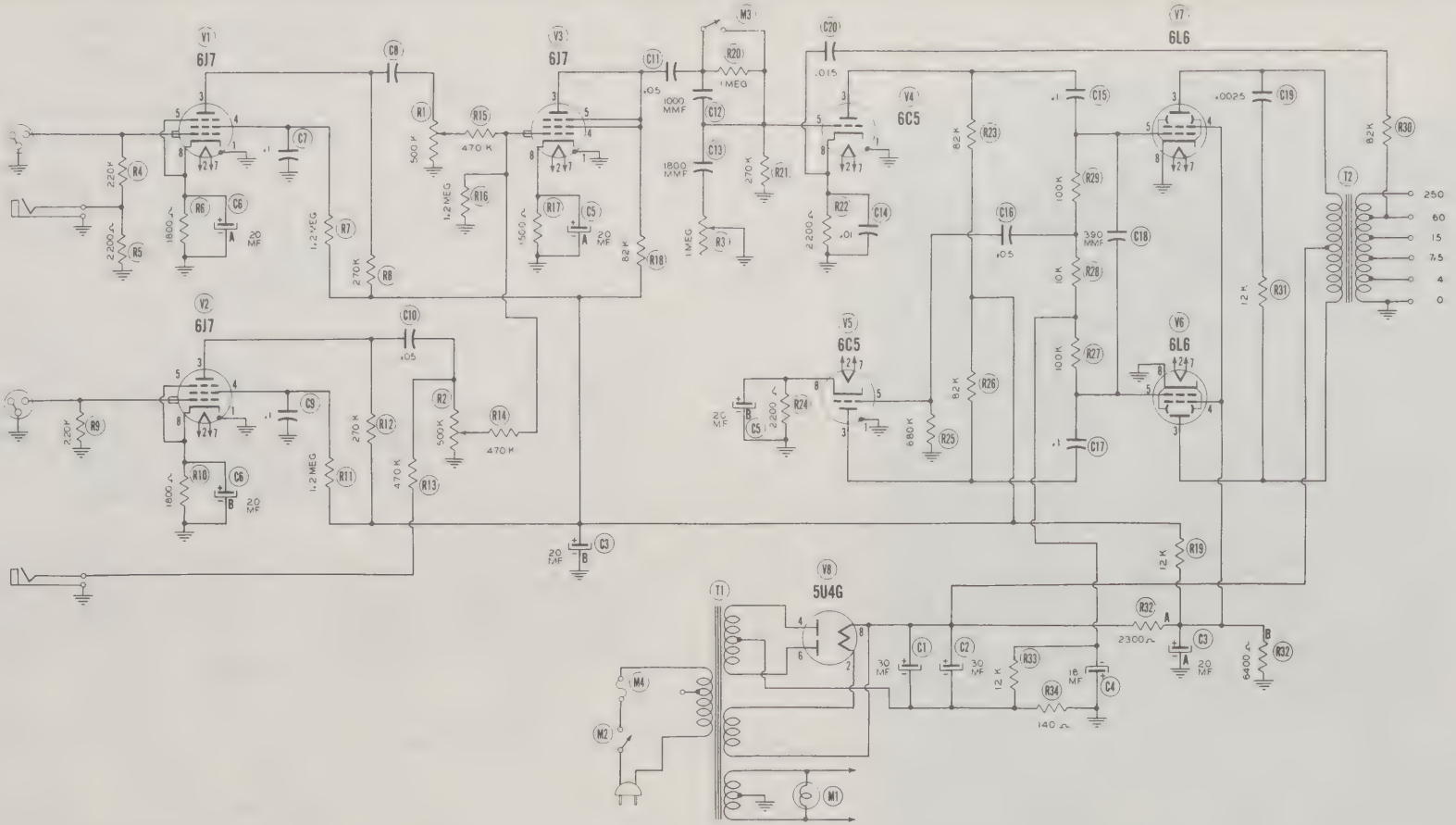


SET 81

FOLDER 12

RCA VICTOR
MODEL MI-12224

RCA VICTOR
MODEL MI-12224



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0	#3VAC	50VDC	25VDC	1.3VDC	0V.	#3VAC	1.3VDC	0V.
V 2	6J7	0	#3VAC	50VDC	25VDC	1.2VDC	205VDC	#3VAC	1.2VDC	0V.
V 3	6J7	0	#3VAC	75VDC	75VDC	75VDC	205VDC	#3VAC	2.3VDC	0V.
V 4	6C5	0	#3VAC	90VDC	0V.	0V.	0V.	#3VAC	3.2VDC	
V 5	6C5	0V.	#3VAC	77VDC	-17VDC	0V.	0V.	#3VAC	3.1VDC	
V 6	6L6	0	#3VAC	377VDC	260VDC	-17VDC	0V.	#3VAC	0V.	
V 7	6L6	0	#3VAC	377VDC	260VDC	-17VDC	380VDC	#3VAC	0V.	
V 8	5U4G	0	380VDC	0V.	390VAC	0V.	390VAC	0V.	380VDC	

6.3VAC measured across filaments.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	TOP CAP
V 1	6J7	0Ω	.1Ω	†285KΩ	†1.2Meg.	1.8KΩ	500KΩ	.1Ω	1.8KΩ	[illegible]
V 2	6J7	0Ω	.1Ω	†285KΩ	†1.2Meg.	1.8KΩ	†14KΩ	.1Ω	1.8KΩ	[illegible]
V 3	6J7	0Ω	.1Ω	†100KΩ	†100KΩ	†100KΩ	†14KΩ	.1Ω	1.5KΩ	[illegible]
V 4	6C5	0Ω	.1Ω	†100KΩ	INF	270KΩ	270KΩ	.1Ω	2.2KΩ	
V 5	6C5	0Ω	.1Ω	†100KΩ	110KΩ	680KΩ	INF	.1Ω	2.2KΩ	
V 6	6L6	0Ω	.1Ω	†140Ω	†2.3KΩ	110KΩ	†12KΩ	[illegible]	[illegible]	
V 7	6L6	0Ω	.1Ω	†140Ω	†2.3KΩ	110KΩ	INF	[illegible]	[illegible]	
V 8	5U4G	0Ω	10KΩ	INF	190Ω	INF	200Ω	INF	1.4K	

† Measured from pin 9 of V8.

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

PHOTOFACT* Folder

RAYTHEON MODELS
7DX21, 7DX22P, 18DX21A

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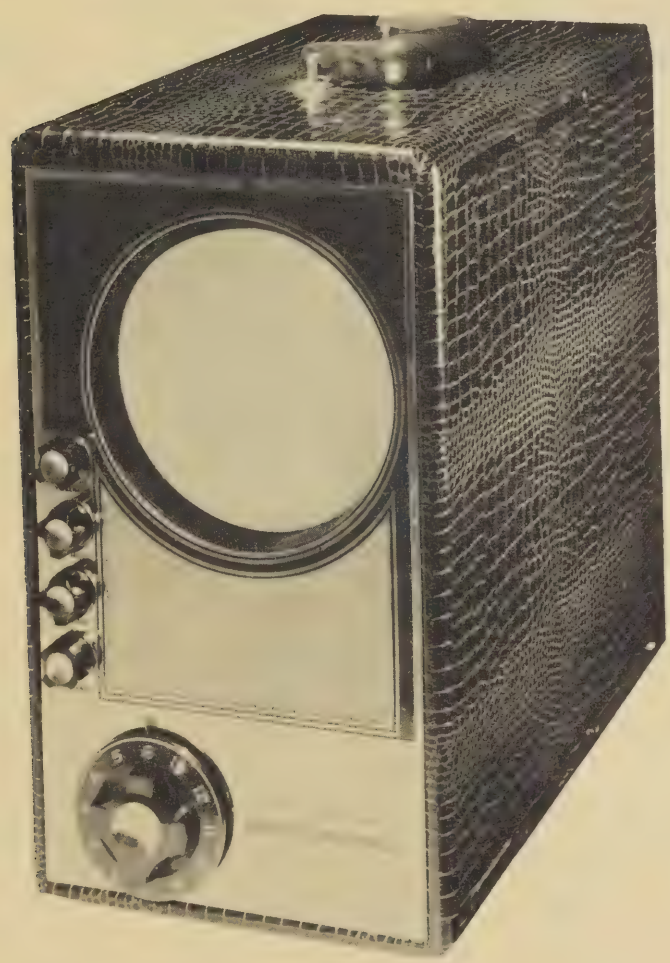

MODEL 7DX22P

RAYTHEON MODELS
7DX21, 7DX22P, 18DX21A

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Date 1/50 Set No. 81—Folder No. 13

RAYTHEON
MODELS 7DX21, 7DX22P, 18DX21A

RAYTHEON MODEL 7DX22P

TRADE NAME	Raytheon, Models 7DX21, 7DX22P, and 18DX21A
MANUFACTURER	Belmont Radio Corporation, 5921 W. Dickens Ave., Chicago 39, Ill.
TYPE SET	Television Receiver
TUBES	Eighteen
POWER SUPPLY	105-125 Volts AC or DC RATING: .97 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

INDEX

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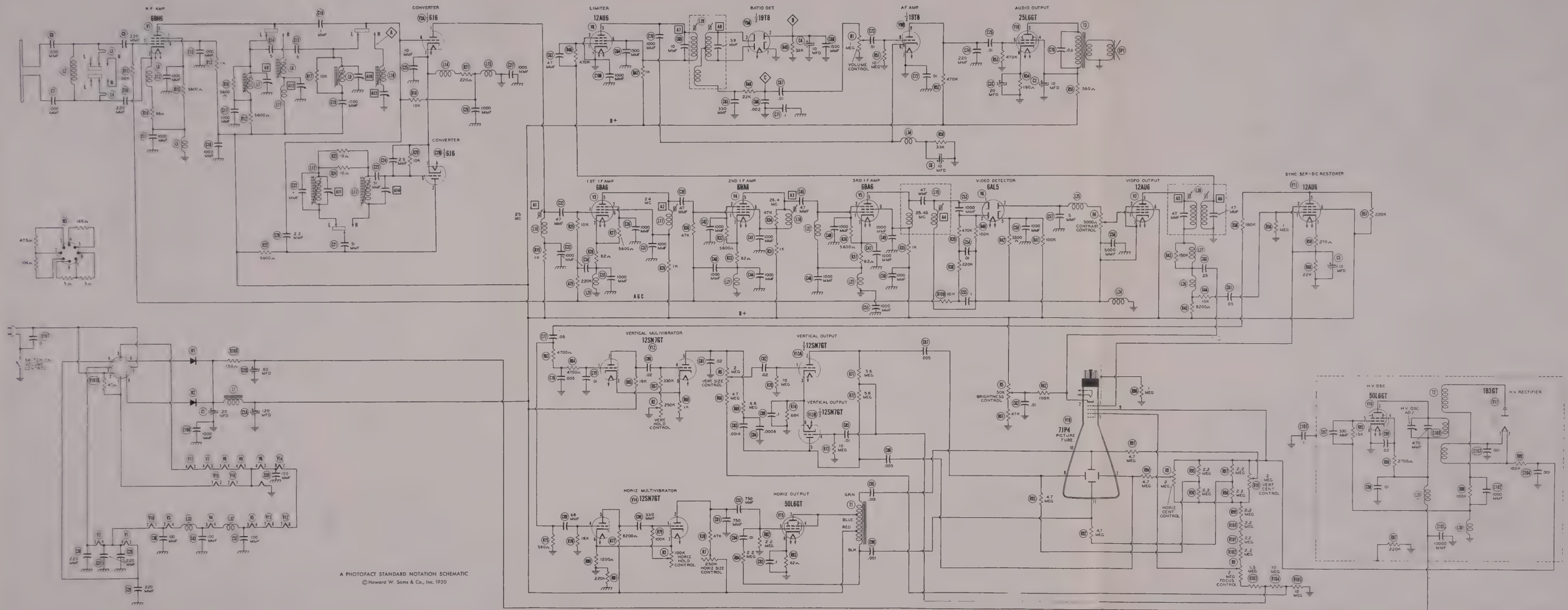
RAYTHEON
MODELS 7DX21, 7DX22P, 18DX21A



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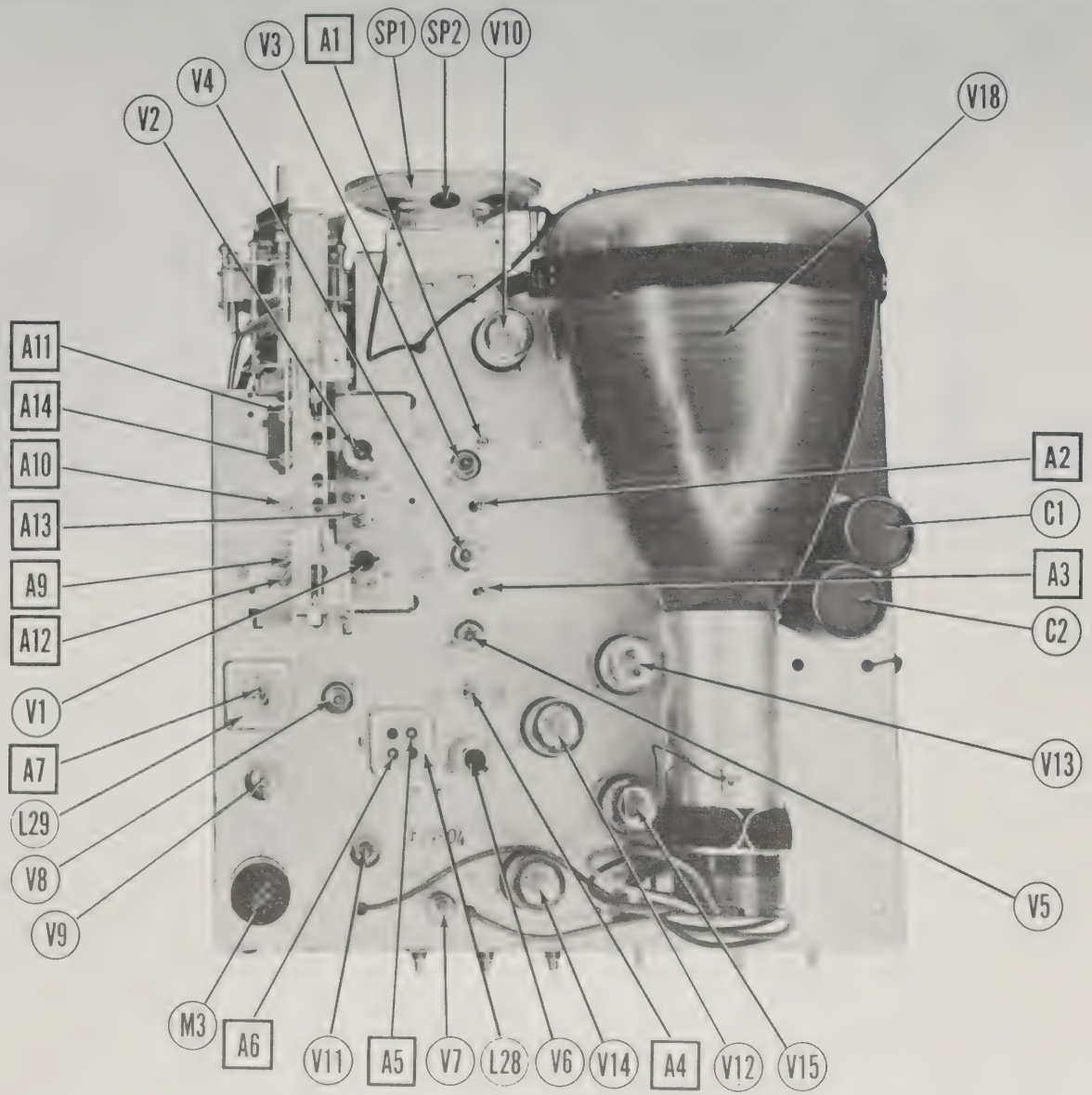
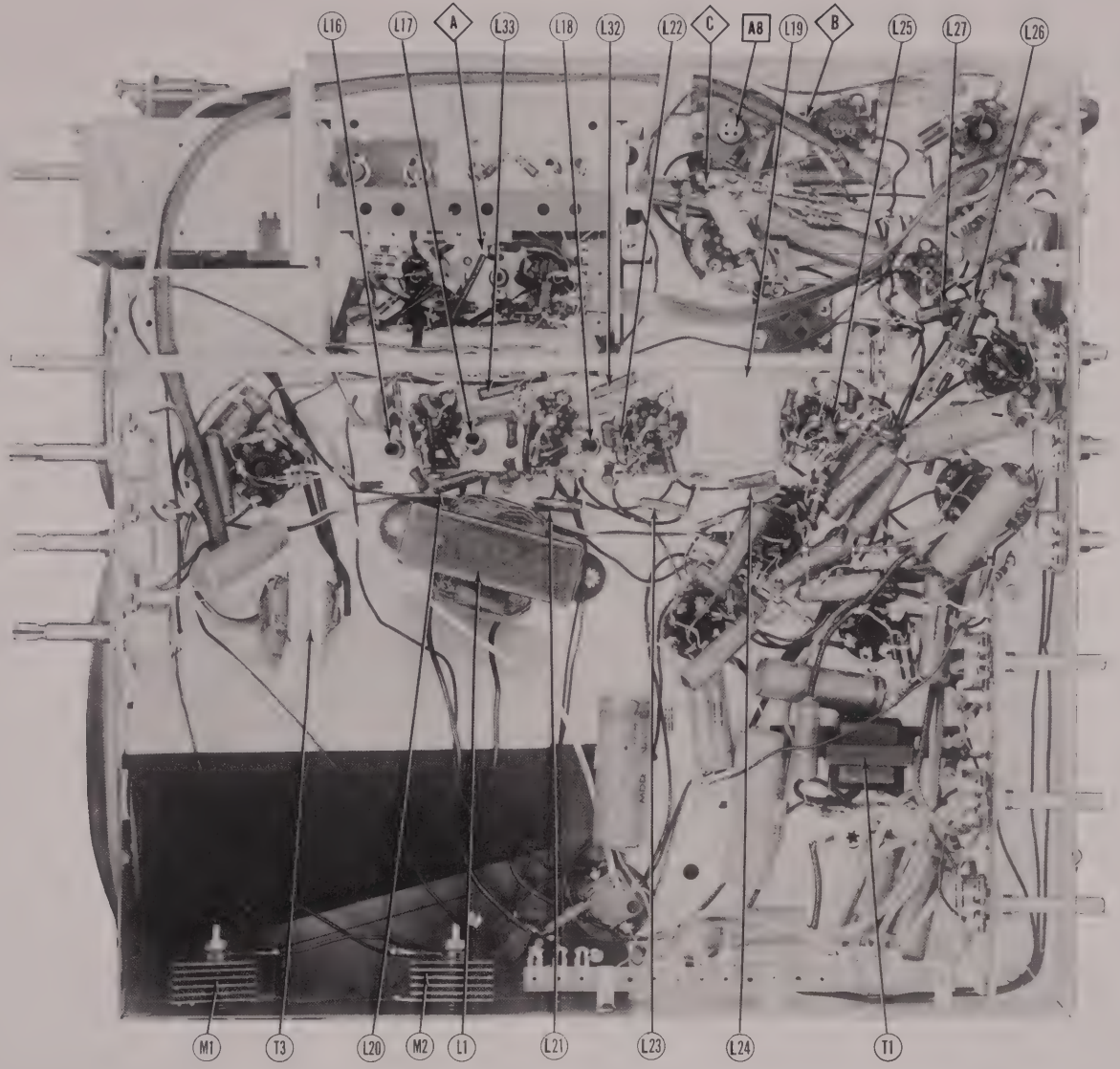
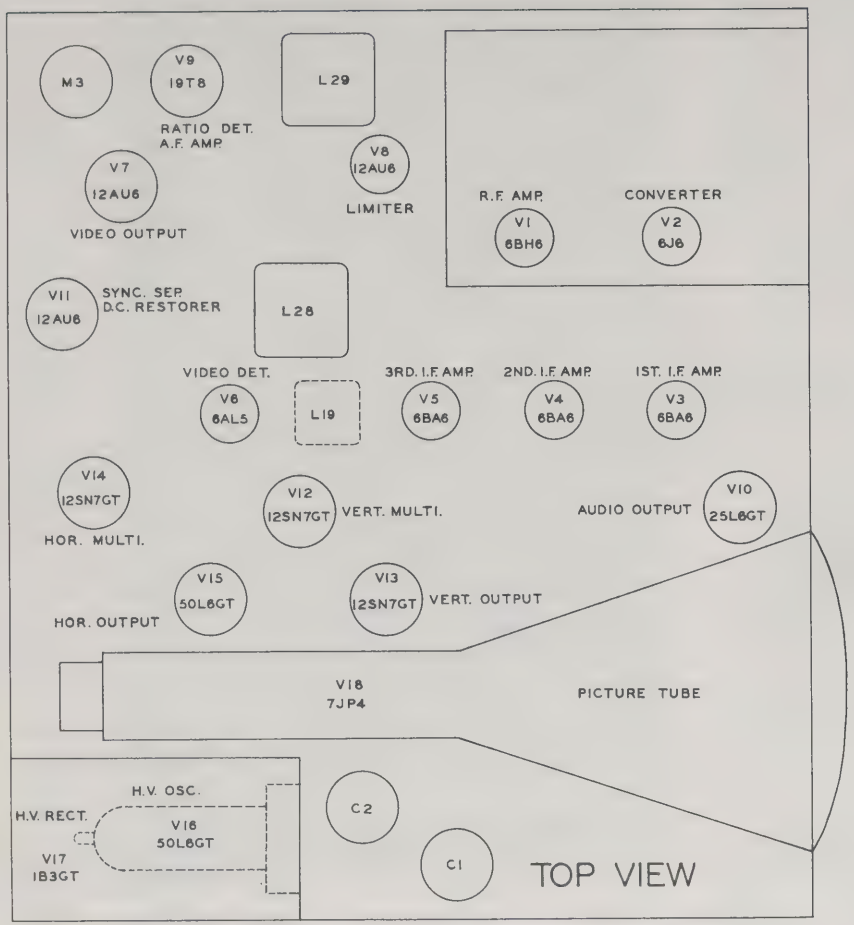
RAYTHEON
MODELS 7DX21, 7DX22P, 18DX21A

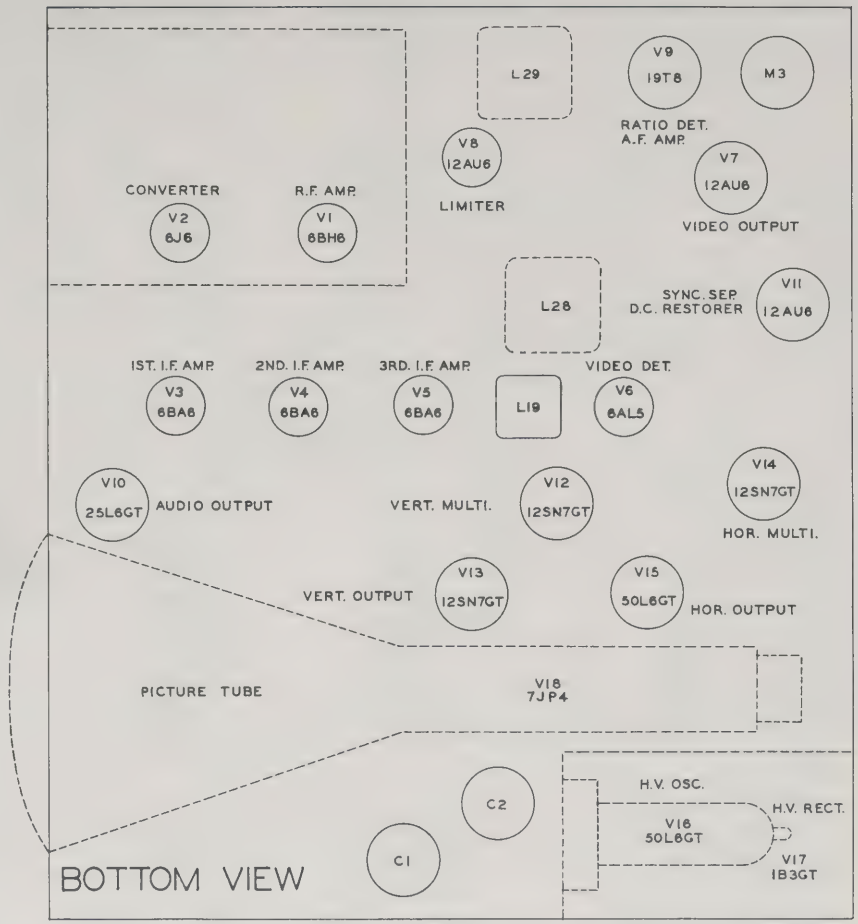


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

PRE- ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Alignment of this receiver may be performed without removal of the picture tube or disabling the high voltage supply. When the receiver is placed on its side, care must be exercised not to damage the picture tube or to come in contact with the high voltage leads.

VIDEO IF ALIGNMENT

Alignment point A, where the IF signal is injected is accessible thru the large hole in the tuner shield on the underside of the tuner.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	47MMF	High side thru 47MMF to Point A. Low side to chassis.	22.0MC	9	Across contrast control (R4,	A1	Adjust for maximum deflection.
2.	47MMF	"	24.0MC	"	"	A2	"
3.	47MMF	"	26.4MC	"	"	A3	"
4.	47MMF	"	26.45MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	47MMF	High side to Point A. Low side to chassis.	24MC (1.5MC Sweep)	26.75MC 22.25MC	9	Across contrast control (R4) with 10KΩ in series with Vert. Amp. lead. Shunt vertical input terminals with .001MFD capacitor.		If necessary, slightly retouch A1, A2, A3, A4 for proper response curve and placement of markers as per Fig 1.

SOUND IF ALIGNMENT

Short the antenna leads during alignment of the ratio detector circuit so extraneous noise pulses will not give erratic indications on the oscilloscope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	across contrast control (Control fully on)	4.5MC (1MC Sweep)	4.5MC	9	Vert. Amp. to Point ◇ Low side to B-.	A5,A6	Disconnect stabilizer cap (C4). Adjust for maximum amplitude and symmetry as per Fig 2.
7.	.01MFD	"	"	"	"	Vert. Amp. to Point ◇ Low side to B-.	A7,A8	Reconnect stabilizer cap. Adjust A7 so 4.5MC marker is at center of pattern as per Fig 3. Adjust A8 for maximum amplitude and straightness of diagonal line.

TUNER ALIGNMENT

Pre-set the tuner cores and trimmers as indicated in figures 4 and 5 before attempting alignment of the tuner. If Fig.5, the dimensions given are the distance from the screw head shoulder to chassis.
When making the adjustments of the station selector screws do not force the screw at any time. The "in" position is reached when the blank shuttle bar holding the core slugs reaches the top limit of its travel. It is possible to force the screw in farther than this point but this results in jamming the tuner.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon res.	Across antenna terminals with 120Ω resistor in each generator lead.	Approx. 82MC (10MC Sweep)	Off	6	Across contrast control (R4) with 10KΩ in Vert. Amp. lead. Shunt vert. input terminals with .001MFD capacitor.	A9,A10	Turn channel 6 station selector screw 1 full turn from its maximum "in" position. Adjust A9 and A10 for maximum amplitude and symmetry as per Fig 6.
9.	"	"	"	83.25MC	"	"	A11	Adjust A11 so marker is 50% down on the low frequency slope on curve. If necessary, repeat step 8.
10.	"	"	Approx. 72MC (1.5MC Sweep, Approx. 66MC (1.5MC Sweep) Approx. 60MC (1.5MC Sweep)	77.25MC 67.25MC 61.25MC	5 4 3	"		Check the response on all low band channels. It may be necessary to forfeit some of the response on one channel to improve that of another by slight retouching of A9 and A10.
11.	"	"	Approx. 57MC (10MC Sweep)	55.25MC	2	"		If it is possible to move video marker to 50% point on the curve by the station-selector screw (with screw at least 2 turns from its maximum "out" position) the low band is properly aligned.

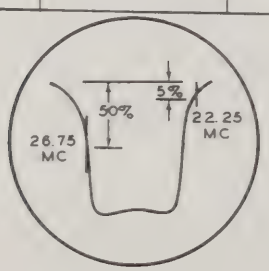


FIG. 1

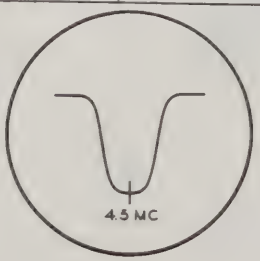


FIG. 2

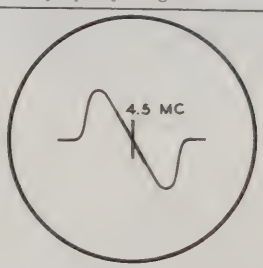
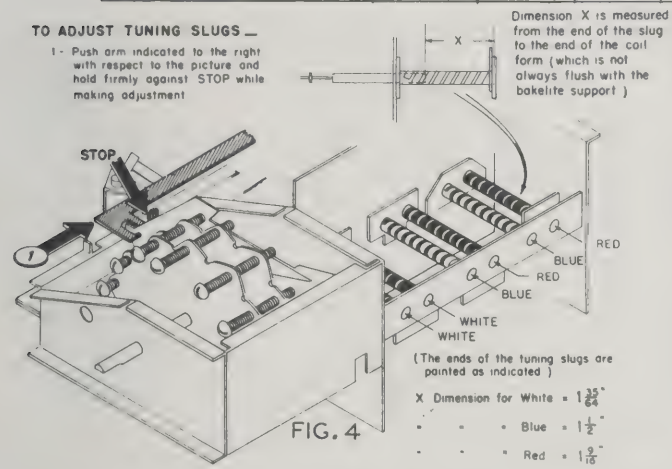


FIG. 3

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	"	"	Approx. 213MC (10MC Sweep)	Off	13	"	A12, A13	Turn channel 13 station selector screw 3/4 turn from it maximum "in" position. Adjust A12 and A13 for maximum amplitude and symmetry as per Fig 6.
13.	"	"	"	211.25MC	"	"	A14	Adjust A14 so marker is 50% down on the low frequency slope on curve. If necessary, repeat step 12.
14.	"	"	Approx. 207MC (10MC Sweep) Approx. 201MC (10MC Sweep) Approx. 195MC (10MC Sweep) Approx. 189MC (10MC Sweep) Approx. 183MC (10MC Sweep)	205.25MC 199.25MC 193.25MC 187.25MC 181.25MC	12 11 10 9 8	"		Check response on all high band channels. If necessary, retouch A12 and A13 for compromise to give best overall response curve.
15.	"	"	Approx. 177MC (10MC Sweep)	175.25MC	7	"		If it is possible to move video carrier marker to 50% point on response curve by adjustment of channel 7 station-selector screw (screw at least one full turn in from its maximum "out" position), the high band is properly aligned.


TO ADJUST TUNING SLUGS —
1 - Push arm indicated to the right with respect to the picture and hold firmly against STOP while making adjustment
STOP
X
Dimension X is measured from the end of the slug to the end of the coil form (which is not always flush with the bakelite support)
RED
BLUE
RED
BLUE
WHITE
WHITE
(The ends of the tuning slugs are painted as indicated)
X Dimension for White = 1 25/64"
" " " Blue = 1 1/2"
" " " Red = 1 9/16"
FIG. 4

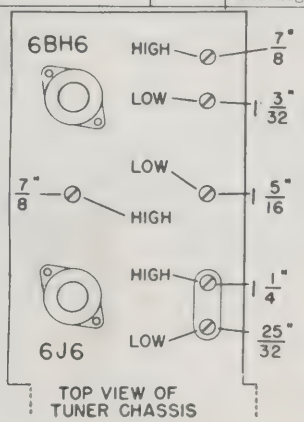


FIG. 5

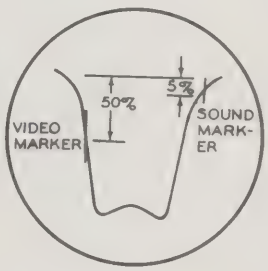
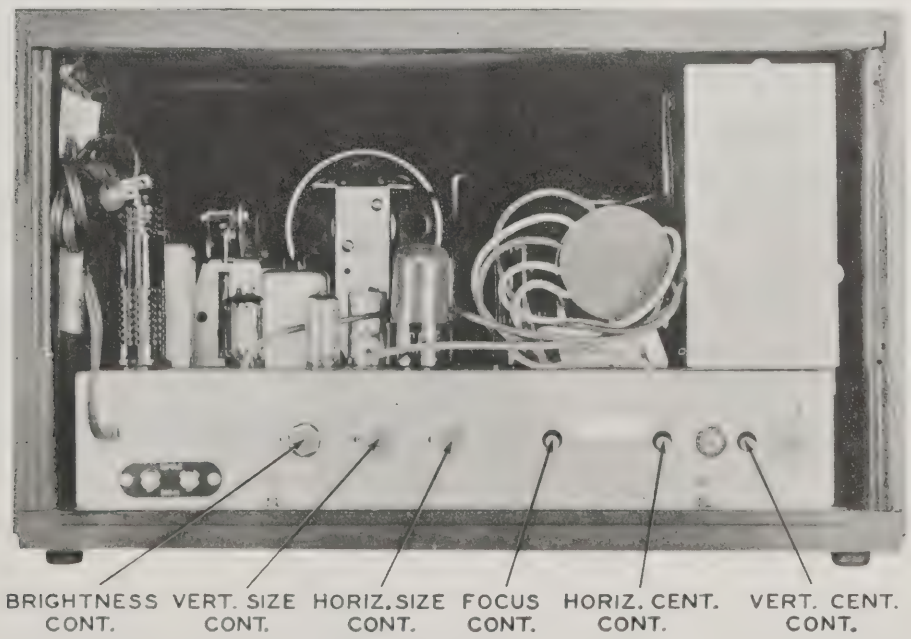


FIG. 6



CABINET-REAR VIEW

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BH6	-.1VDC	.4VDC	85VAC	90VAC	100VDC	125VDC	0V		
V 2	6J6	125VDC	85VDC	95VAC	90VAC	§1.5 VDC	0V	2VDC		
V 3	6BA6	-.1VDC	1.1VDC	65VAC	58VAC	115VDC	115VDC	1.1VDC		
V 4	6BA6	-.1VDC	1.1VDC	58VAC	50VAC	115VDC	115VDC	1.1VDC		
V 5	6BA6	0V	1.7VDC	50VAC	45VAC	115VDC	115VDC	1.7VDC		
V 6	6AL5	0V	0V	12VAC	6VAC	4.2VDC	0V	-4VDC		
V 7	12AU6	0V	0V	35VAC	45VAC	40VDC	125VDC	0V		
V 8	12AU6	-.4VDC	0V	35VAC	24VAC	115VDC	115VDC	0V		
V 9	19T8	-.4VDC	-.6VDC	-.4VDC	24VAC	6VAC	-.6VDC	0V	-.4VDC	43VDC
V 10	25L6GT	0V	90VAC	93VDC	100VDC	0V	0V	65VAC	8VDC	
V 11	12AU6	0V	4.5VDC	45VAC	55VAC	87VDC	125VDC	4.5VDC		
V 12	12SN7GT	0V	80VDC	2.5VDC	2.5VDC	31VDC	2.5VDC	36VAC	24VAC	
V 13	12SN7GT	0V	295VDC	16VDC	0V	265VDC	16VDC	45VAC	36VAC	
V 14	12SN7GT	-1VDC	30VDC 65VDC	4.2VDC	0V	105VDC	4.2VDC	24VAC	12VAC	
V 15	50L6GT	0V	60VAC	125VDC	125VDC	-9.2VDC	0V	110VAC	1VDC	
V 16	50L6GT	0V	60VAC	130VDC	100VDC	-13.5 VDC	0V	6VAC	0V	
V 17	1B3GT	* DO NOT MEASURE								

PINS	1	2	3	4	5	6	7	8	9	10	11	14
V18 7JP4	6VAC	120VDC	4.5VDC	0V	*	0V	*	*	*	*	*	0V

* Do Not Measure.

§TAKEN WITH VACUUM TUBE VOLTMETER

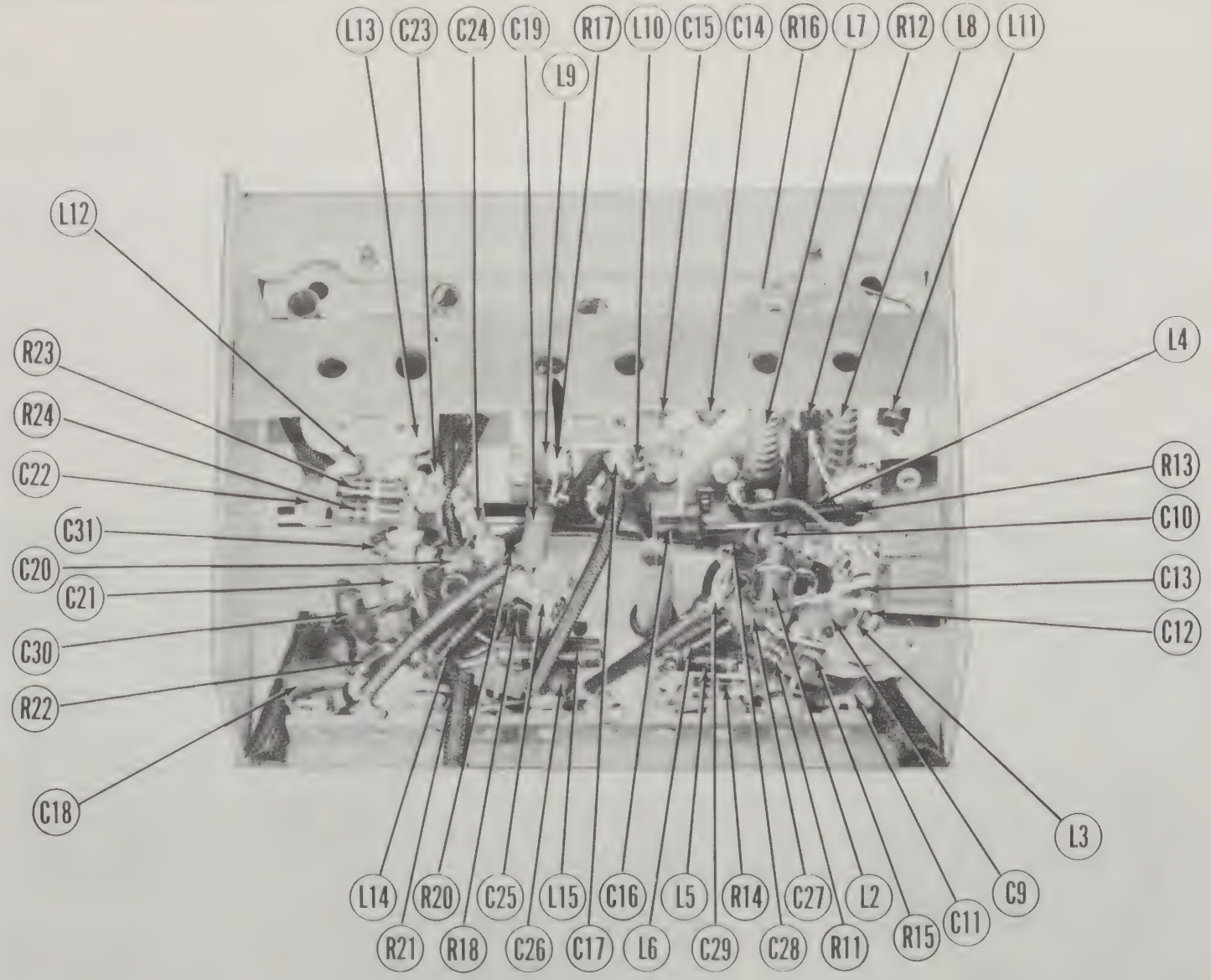
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BH6	900KΩ	68Ω	42Ω	38Ω	†5.9KΩ	†10.0Ω	5.6KΩ		
V 2	6J6	†1000Ω	†5.5KΩ	39Ω	38Ω	10KΩ	10KΩ	220Ω		
V 3	6BA6	1 Meg.	5.6KΩ	33Ω	31Ω	†1000Ω	†1000Ω	82Ω		
V 4	6BA6	850KΩ	5.6KΩ	30Ω	28Ω	†1000Ω	†1000Ω	82Ω		
V 5	6BA6	3Ω	5.6KΩ	27Ω	24Ω	†1000Ω	†1000Ω	82Ω		
V 6	6AL5	1.5Ω	100KΩ	4.5Ω	1.5Ω	3.3KΩ	Inf.	5KΩ		
V 7	12AU6	7Ω	1.5Ω	28Ω	36Ω	†8.2KΩ	†63Ω	1.5Ω		
V 8	12AU6	470KΩ	0Ω	28Ω	19Ω	†1000Ω	†1000Ω	0Ω		
V 9	19T8	Inf.	33KΩ	Inf.	19Ω	1.5Ω	33KΩ	0Ω	10 Meg.	†470KΩ
V 10	25L6GT	Inf.	37Ω	†800Ω	†620Ω	470KΩ	0Ω	33Ω	180Ω	
V 11	12AU6	1 Meg.	22KΩ	36Ω	44Ω	†220KΩ	†63Ω	20.2KΩ		
V 12	12SN7GT	10KΩ	†18KΩ	1000Ω	350KΩ	17 Meg.	1000Ω	20Ω	13Ω	
V 13	12SN7GT	10 Meg.	25.6 Meg.	68KΩ	10 Meg.	25 -6 Meg.	68KΩ	24Ω	20Ω	
V 14	12SN7GT	100KΩ	†300KΩ †50KΩ	1.2KΩ	18KΩ	†8.2KΩ	1.2KΩ	13Ω	4.5Ω	
V 15	50L6GT	Inf.	40Ω	†100Ω	†100Ω	2.2 Meg	0Ω	58Ω	6Ω	
V 16	50L6GT	Inf.	40Ω	†150Ω	†2.7KΩ	15KΩ	Inf.	1.5Ω	0Ω	
V 17	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP 100KΩ

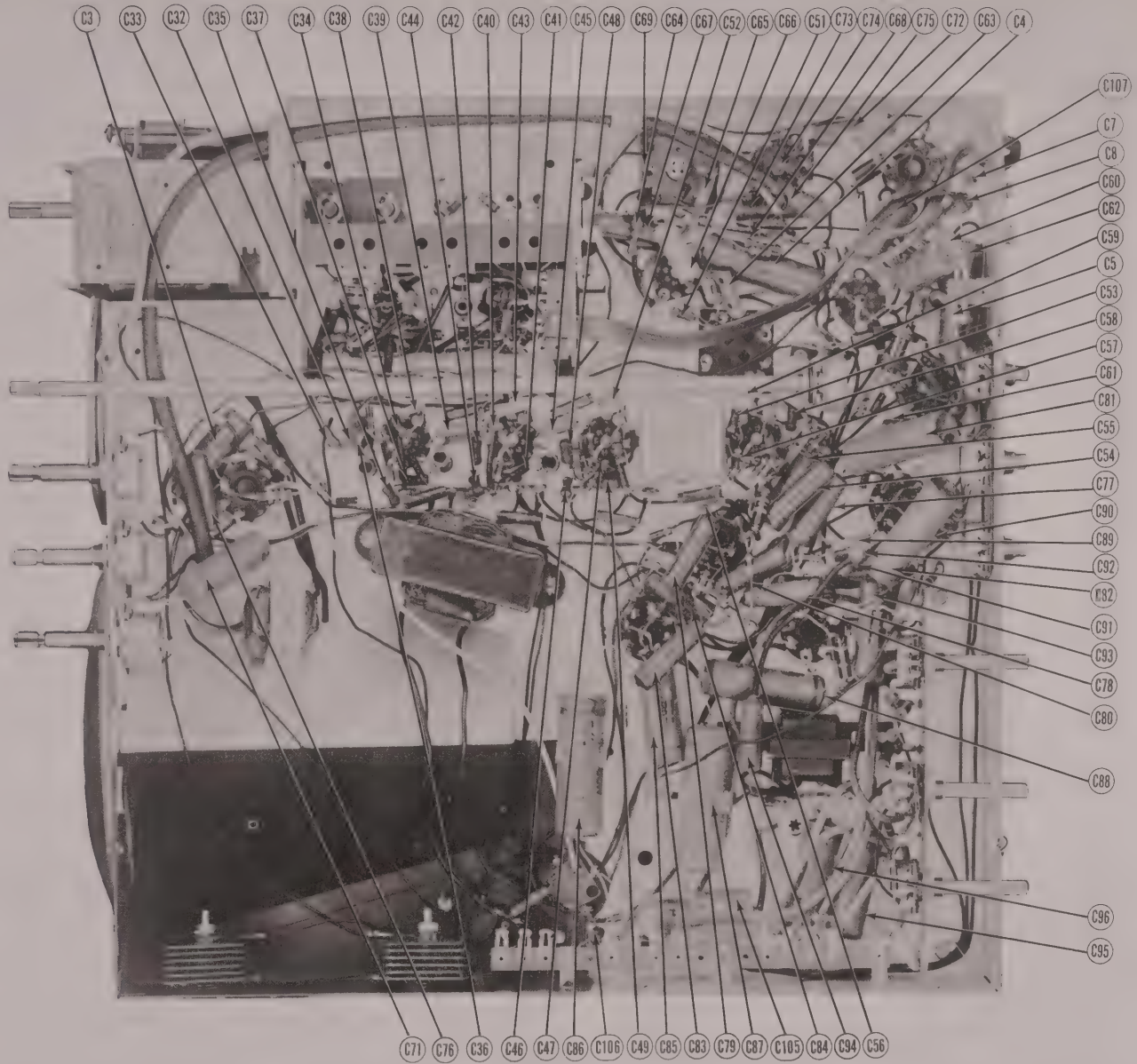
PINS	1	2	3	4	5	6	7	8	9	10	11	14
V18 7JP4	1.5Ω	†180KΩ	22KΩ	Inf.	25 Meg.	Inf.	40 Meg.	40 Meg.	35 Meg	42 Meg 40 Meg	40 Meg	0Ω

† Measured From Output Of M1.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

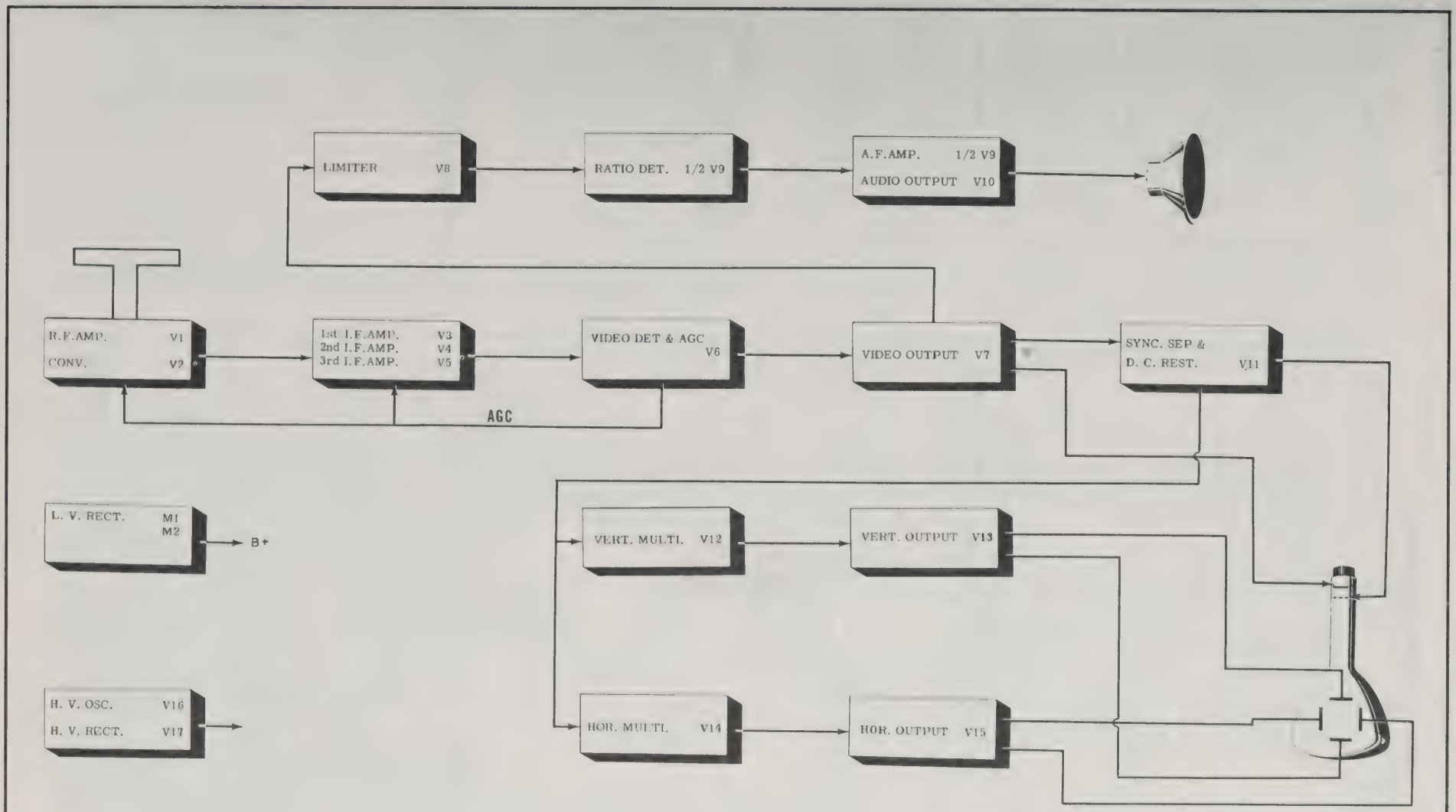


RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6BH6	6BH6	7CM	
V2	Converter	6J6	6J6	7BF	
V3A	1st IF Amp.	6BA6	6BA6	7BK	Used in models 7DX21 and 18DX21A
V3B	1st Video IF	6AG5	6AG5	7BD	Used in model 7DX22P
V4A	2nd Video IF	6BA6	6BA6	7BK	Used in models 7DX21 and 18DX21A
V4B	2nd Video IF	6AG5	6AG5	7BD	Used in model 7DX22P
V5A	3rd Video IF	6BA6	6BA6	7BK	Used in models 7DX21 and 18DX21A
V5B	3rd Video IF	6AG5	6AG5	7BD	Used in model 7DX22P
V6	Detector	6AL5	6AL5	6BT	
V7	Video Output	12AU6	12AU6	7BK	
V8	Limiter	12AU6	12AU6	7BK	
V9	Ratio Det.-AF Amp.	19T8	19T8	9E	
V10	Audio Output	25L6GT	25L6GT	7AC	
V11	Sync. Sep.-DC Restor.	12AU6	12AU6	7BK	
V12	Vert. Multivibrator	12AU7	12AU7	8BD	
V13	Vert. Output	12SN7GT	12SN7GT	8BD	
V14	Hor. Multivibrator	12SN7GT	12SN7GT	8BD	
V15	Hor. Output	50L6GT	50L6GT	7AC	
V16	HV Osc.	50L6GT	50L6GT	7AC	
V17	HV Rectifier	1B3GT	1B3GT	3C	
V18	Picture Tube	7JP4	7JP4	14J	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1	120	150	B-8H-15664	AFH24D			TVL-44	Filter
C2A	120	150	B-8C-15948	AFH2412D4A	UP 5S515C†			▲ Filter
C2B		150						■ Filter
C3	50	150	A-8C-11436	FRS15-12	8P15-15		UT-121	Output Cathode Bypass
C4	50	150	A-8C-11436	FRS15-12	8P15-15		UT-121	Output Decoupling
C5	.1		A-8C-12132	PRS1	5S10C		TVA-14	Stabilizing Cap.
C6	10	50	A-8C-13137	PRS50/10	8R10S		TVA-14	V. Amp. Cath. Bypass
C7	50	150	A-8C-11436	FRS15-12	8P15-15		UT-121	Dyn. Limiter Cath. *
C8	.01		C-8G-13201	1468-001	1W5D1	5PC1-001	1FM-21	Ant. Coupling
C9	.01		C-8G-13201	1468-001	1W5D1	5PC1-001	1FM-21	Ant. Coupling
C9	220		C-8G-16045			GP2K-200		RF Coupling
C10	220		C-8G-16045			GP2K-200		RF Coupling
C11	1000		C-8G-13201			GP2L-001		RF Bypass
C12	1000		C-8G-13201			GP2L-001		RF Supp. Bypass
C13	1000		C-8G-13201			GP2L-001		RF Screen Bypass
C14	1.5		A-8G-12486					RF Coupling
C15								
C16	1.5		A-8G-12486					RF Coupling
C17								
C18	1		A-8G-12495					RF Coupling
C19								
C20	1000		C-8G-13201			GP2L-001		RF Plate Dec.
C21	1000		C-8G-13201			GP2L-001		RF Bypass
C22	2.2		A-8G-12495					RF Bypass
C23	51		C-8G-11891					Osc. Coupling
C24	2.5		C-8G-15737					Osc. Feedback
C25	10		C-8G-11789			NPOK-10		Osc. Feedback
C26	1000		C-8G-13201			GP2L-001		Osc. Grid Cap
C27	1000		C-8G-13201			GP2L-001		RF Bypass
C28	220		C-8G-16045			GP2K-200		RF Bypass
C29	220		C-8G-16045			GP2K-200		RF Fil. Bypass
C30	220		C-8G-16045			GP2K-200		RF Fil. Bypass
C31	220		C-8G-16045			GP2K-200		Conv. Fil. Bypass
C32	47	500	C-8F3-109	1468-00005	5W5Q5	GP1K-50	1FM-45	Conv. Fil. Bypass
C33	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	IF Coupling
C34	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	Conv. Plate Dec.§
C35	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	AGC Filter§
C36	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C37	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	1st IF Supp. Bypass *
C38	47	500	C-8F3-109	1468-00005	5W5Q5	GP1K-50	1FM-45	1st IF Decoupling
C39			C-8G-11789	1468-001	1W5D1	GP1K-100	1FM-21	1st IF Fil. Bypass
C40	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	AGC Filter §
C41	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	2nd IF Decoupling
C42	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	2nd IF Supp. Bypass *
C43	100		C-8G-11734	1468-0001	5W5T1	GP1K-100	1FM-31	2nd IF Fil. Bypass
C44	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C45	47	500	C-8F3-109	1468-00005	5W5Q5	GP1K-50	1FM-45	IF Coupling
C46	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C47	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	3rd IF Cath. Bypass
C48	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	3rd IF Supp. Bypass *
C49	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	3rd IF Decoupling
C50	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C51	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass §
C52	100		C-8G-11734	1468-0001	5W5T1	GP1K-100	1FM-31	3rd IF Fil. Bypass
C53	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	IF Coupling
C54	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	AGC Filter
C55	.1	200	C-8D-10771	P288-1	GT2P1		TM-1	AGC Filter
C56	5000		A-8G-13962	1467-005	1U5D5	GP2M-005	1FM-25	RF Bypass
C57	5		C-8G-12166	1468-000005	5W5V5	NPOK-5	MS-55	V Diode Filter
C58	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	DAGC Decoupling
C59	100		C-8G-11734	1468-0001	5W5T1	GP1K-100	1FM-31	V DET-AGC Fil. Bypass
C60	.25	200	C-8D-10775	P488-25	GT2P25		TM-2	Video Coupling
C61	.05	200	C-8D-10770	P288-05	GT2S5		TM-15	Video Coupling
C62	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Pic Tube Cath. Dec.
C63	47	500	C-8F3-109	1468-00005	5W5Q5	GP1K-50	1FM-45	S. IF Coupling
C64	1500		C-8G-11731	1467-0015	1W5D15	GP2L-0015	1FM-215	S. IF Decoupling
C65	82	500	C-8F-5432	1468-00082	5W5Q5	GP1K-82	1FM-45	Diode Load Cap
C66	.002	600	C-8D-10778	P688-002	GT6D2	GP2M-002	TM-22	De-emphasis
C67	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Audio Coupling

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C68	1500		C-8G-11731	1467-0015	1W5D15	GP2L-0015	1FM-215	RF Bypass
C69	10			1469-00001	5R5Q1	NPOK-10	MS-41	Fixed Trimmer *
C70	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	S. IF Coupling *
C71	.1	400	C-8D-10760	P488-1	GT4P1		TM-1	Line Isolation
C72	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Line Isolation
C73	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Audio Coupling
C74	220		C-8G-11733	1468-00025	5W5T25	GP2K-250	1FM-325	AF Plate Bypass
C75	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Audio Coupling
C76	.02	200	C-8D-10772	P288-02	GT2S2		TM-12	Output Plate Bypass
C77	.05	200	C-8D-10770	P288-05	GT2S5		TM-15	Sync. Coupling
C78	.005	600	C-8D-10935	P688-005	GT6S5	GP2M-005	TM-25	Integrator Net
C79	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Integrator Net
C80	.02	200	C-8D-11304	P488-02	GT2S2		TM-12	Vert. Mult. Feedback
C81	.02	1600		P1688-02	GT16S2		MB-12	Vert. Discharge
C82	.02	1600		P1688-02	GT16S2		MB-12	Vert. Coupling
C83	.0014	1000		T1688-0015				Voltage Divider *
C84	.0068	1600						Voltage Divider *
C85	.01	1600	B-8D-13868	1688-01	GT16S1		MB-11	Vert. Coupling
C86	.005	6000	B-8D-13549	7584-005	D5TH -60D5		TVH-256	Vert. Coupling
C87	.005	6000	B-8D-13549	7584-005	D5TH -60D5		TVH-256	Vert. Coupling
C88	.1	600	C-8D-10983	P698-1	GT6P1		TM-1	Vert. Output Cath. Byp.
C89	68	500	C-8F3-111					Hor. Sync. Coupling
C90	330	500	C-8F3-119					Hor. Mult. Feedback
C91	750	500	C-8F3-246	1469-00075				Hor. Discharge
C92	750	500	C-8F3-246	1469-00075				Hor. Coupling
C93	.1	200	C-8D-10771	P288-1	GT2P1		TM-1	Hor. Output Cath. Byp.
C94	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Hor. Feedback
C95	.001	6000	B-8D-13523	7584-001	D5TH -60D1		TVH-216	Hor. Coupling
C96	.001	6000	B-8D-13523	7584-001	D5TH -60D1		TVH-216	Hor. Coupling
C97	330	500	C-8F3-119					HV Osc. Grid Cap
C98	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	HV Osc. Decoupling
C99	.02	200	C-8D-11304	P488-02	GT2S2		TM-12	HV Screen Byp.
C100	470	500	C-8F3-121	1469-0005	5R5T5		MS-35	Fixed Trimmer
C101	10000		A-8G-16019	P488-01	GT4S1	GP2-335-01	TM-11	RF Bypass
C102	.001		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass
C103	.001	6000	B-8D-13523				TVH-216	HV Filter
C104	.001	6000	B-8D-13523				TVH-216	HV Filter
C105	.1	400	C-8D-10760	P488-1	GT4P1		TM-1	HV Power Supply Isol.
C106	1000		C-8G-13201	1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass §
C107	.01	200	C-8D-11738	P488-01	GT2S1	GP2-335-01	TM-11	Line Filter
C108	1000			1468-001	1W5D1	GP2L-001	1FM-21	RF Bypass *

* Not Used In All Models.
† Parallel Sections To Obtain Desired Capacity.
§ Model A-7DX22P uses .005 Mfd. in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1A	1 Mer.	½	A-10A15666	Q13-137	AM-53-2	Volume Control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R1A Per Instructions
C	Switch		Not Req.	76-1	SW-4	Attach to R1A Per Instructions
R2A	250KΩ	½	B-10B15671	Q11-130	AM-55-S	Vert. Hold Control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R2A Per Instructions
R3A	100KΩ	½	B-10B15670	Q11-128	AM-49-S	Horiz. Hold Control
B	Shaft		Not Req.	Not Req.	KSS-3	Attach to R3A Per Instructions
R4A	500KΩ	½	A-10B15672	Q11-114	AM-19-S	Contrast Control
B	Shaft		Not Req.	GQ	DFS-½	Attach to R4A Per Instructions
R5	50KΩ	½	A-10B15672	Q11-123	M-44-S	Brightness Control
R6	2 Meg.	½	A-10B15650	Q11-139	M-63-S	Vert. Size Control
R7	250KΩ	½	A-10B15614	Q11-130	M-55-S	Horiz. Size Control
R8	2 Meg.	½	B-10B15627			Focus Control
R9	2 Meg.	½	B-10B15627			Horiz. Centering Control
R10	2 Meg.	½	B-10B15627			Vert. Centering Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R11	100KΩ	½	C-9B1-86		RF Grid
R12	5600Ω	½	C-98L-71		RF Plate
R13	100Ω	½	C-9B1-13		RF Screen Decoupling 20%
R14	68Ω	½	C-9B1-48		RF Cathode
R15	5600Ω	½	C-9B1-71		RF Suppressor Grid
R16	5600Ω	½	C-9B1-71		RF Coil Shunt
R17	10KΩ	½	C-9B1-74		Mixer Grid Coil Shunt
R18	10KΩ	½	C-9B1-74		Mixer Grid
R19	1000Ω	½	C-9B1-13		Mixer Plate Decoup. 20%
R20	10KΩ	½	C-9B1-74		Osc. Grid
R21	200Ω	½	C-9B1-54		Osc. Cathode
R22	5600Ω	½	C-9B1-71		Osc. Plate
R23	10Ω	½	C-98L-38		Parasitic Supp.
R24	10Ω	½	C-9B1-38		Parasitic Supp.
R25	10KΩ	½	C-9B1-19		1st IF Grid See note 3 20%
R26	1000Ω	½	C-9B1-13		1st IF Decoup. 20%
R27	5600Ω	½	C-9B1-71		1st IF Suppressor Grid See note 1
R28	82Ω	½	C-9B1-133		1st IF Cathode See note 4 5%
R29	220KΩ	½	C-9B1-27	BTS-220K	AGC Network 20%
R30	47KΩ	½	C-9B1-82		2nd IF Grid
R31	1000Ω	½	C-9B1-13		2nd IF Decoup. 20%
R32	5600Ω	½	C-9B1-71	BTS-5600	2nd IF Suppressor Grid See note 1
R33	82Ω	½	C-9B1-133		2nd IF Cathode See note 4 5%
R34	47KΩ	½	C-9B1-82		2nd IF Transformer Shunt See note 5
R35	1000Ω	½	C-9B1-13		3rd IF Decoup. 20%
R36	5600Ω	½	C-9B1-71		3rd IF Suppressor Grid See note 1
R37	82Ω	½	C-9B1-131		3rd IF Cathode See note 4 5%
R38	220KΩ	½	C-9B1-27	BTS-220K	AGC Network
R39	470KΩ	½	C-9B1-94	BTS-470K	AGC Network
R40	100KΩ	½	C-9B1-86	BTS-100K	AGC Diode Load

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R41	100KΩ	½	C-9B1-86	BTS-100K	Voltage Divider
R42	3300Ω	½	C-9B1-68	BTS-3300	Voltage Divider
R43	150KΩ	½	C-9B1-26	BTS-150K	Peaking Coil Shunt 20%
R44	10KΩ	½	C-9B1-19	BTS-10K	Phase Correction 20%
R45	8200Ω	½	C-9B1-73	BTS-8200	Video Output Plate
R46	470KΩ	½	C-9B1-94		Limiter Grid
R47	1000Ω	½	C-9B1-13		Limiter Decoup.
R48	22KΩ	½	C-9B1-76	BTS-22K	De-emphasis
R49	33KΩ	½	C-9B1-80	BTS-33K	Diode Load
R50	33KΩ	½	C-9B1-80	BTS-33K	Limiter Diode Load See Note 1
R51	10 Meg.	½	C-9B1-37	BTS-10 Meg.	AF Grid
R52	470KΩ	½	C-9B1-94	BTS-470K	AF Plate
R53	470KΩ	½	C-9B1-94	BTS-470K	Output Grid
R54	180Ω	1	C-9B2-53	BW-1-180	Output Cathode
R55	560Ω	1	C-9B2-59	BW-1-560	Filter
R56	1 Meg.	½	C-9B1-91	BTS-1 Meg.	Sync. Sep. Grid 20%
R57	270KΩ	½	C-9B1-27	BTS-270K	Sync. Sep. Plate 30%
R58	180KΩ	½	C-9B1-89	BTS-180K	Sync. Coupling Network
R59	270Ω	½	C-9B1-55	BW-½-270	Sync. Sep. Cathode
R60	22KΩ	½	C-9B1-78	BTS-22K	Sync. Sep. Cathode
R61	47KΩ	½	C-9B1-82	BTS-47K	Voltage Divider
R62	150KΩ	½	C-9B1-28	BTS-150K	Voltage Divider
R63	4700Ω	½	C-9B1-70	BTS-4700	Integrator
R64	4700Ω	½	C-9B1-70	BTS-4700	Integrator
R65	18KΩ	1	C-9B2-77	BTA-18K	Vert. MV Plate
R66	4.7 Mer.	½	C-9B1-35	BTS-4.7 Meg.	Vert. MV Plate
R67	330KΩ	½	C-9B1-92	BTS-330K	Vert. MV Grid
R68	100Ω	½	C-9B1-159	BTS-1000-5%	Vert. MV Cathode 5%
R69	6.8 Mer.	½		BTS-6.8 Meg.	Feedback
R70	1 Meg.	½	C-9B1-37	BTS-1 Meg.	Vert. Output Grid 20%
R71	5.6 Meg.	½	C-9B1-249	BTS-5.6Meg-5%	Vert. Output Plate 5%
R72	5.6 Meg.	½	C-9B1-249	BTS-5.6Meg-5%	Vert. Output Plate 5%
R73	10 Meg.	½	C-9B1-37	BTS-10 Meg.	Vert. Output Grid
R74	68KΩ	½	C-9B1-84	BTS-68K	Vert. Output Cathode See note 7
R75	560Ω	½	C-9B1-59	BTS-560	Differentiator
R76	18KΩ	½	C-9B1-77	BTS-18K	Horiz. MV Grid
R77	82000Ω	½	C-9B1-73	BTS-8200	Horiz. MV Plate
R78	47KΩ	½	C-9B1-82	BTS-47K	Horiz. MV Plate
R79	10KΩ	½	C-9B1-86	BTS-10K	Horiz. MV Grid
R80	12000Ω	½	C-9B1-161	BTS-12K-5%	Horiz. MV Cathode 5%
R81	220KΩ	½	C-9B1-27	BTS-220K	Isolation
R82	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg	Horiz. Output Grid
R83	22Ω	1	C-9B2-130	BW-1-22	Horiz. Output Cathode
R84	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg	Feedback See note 8
R85	15KΩ	½	C-9B1-76	BTS-15K	H V Osc. Grid
R86	27000Ω	1	C-9B2-66	BTA-27000	H V Osc. Screen
R87	220KΩ	½	C-9B1-27	BTS-220K	Isolation
R88	100KΩ	1	C-9B2-25		H V Filter
R89	100KΩ	½	C-9B1-25		H V Filament
R90	1 Meg.	½	C-9B1-31	BTS-1 Meg.	Isolation See note 1
R91	4.7 Meg.	½	C-9B1-35		Vert. Deflection Load
R92	4.7 Meg.	½	C-9B1-35		Vert. Deflection Load
R93	4.7 Meg.	½	C-9B1-35		Horiz. Deflection Load
R94	4.7 Meg.	½	C-9B1-35		Horiz. Deflection Load
R95	2.2 Meg.	½	C-9B1-102		Voltage Divider
R96	2.2 Meg.	½	C-9B1-102		Voltage Divider
R97	2.2 Meg.	½	C-9B1-102		Voltage Divider
R98	2.2 Meg.	½	C-9B1-102		Voltage Divider
R99	2.2 Meg.	1	C-9B2-239		Voltage Divider 5%
R100	2.2 Meg.	1	C-9B2-239		Voltage Divider 5%
R101	2.2 Meg.	1	C-9B2-239		Voltage Divider 5%
R102	2.2 Meg.	1	C-9B2-239		Voltage Divider See note 1 5%
R103	1.5 Meg.	1	C-9BC-225		Voltage Divider See note 9 5%
R104	10 Meg.	½	C-9B1-37		Voltage Divider 20%
R105	10 Meg.	½	C-9B1-37		Voltage Divider See note 1 20%
R106	150Ω	1	C-9B2-8	BW-2-150	Filter
R107A	47Ω	2	C-9B4-5	BW-2-47	Filament String
B	68Ω	1	C-9B2-130	BW-1-68	Filament String See Note 2
R108	10KΩ			BTS-10K	Bias Network See note 1

Note 1 - Not used in all models.
Note 2 - Used in model 18DX21A only.
Note 3 - Model 7DX22P uses 22KΩ in this application.
Note 4 - Model 7DX22P uses 47Ω in this application.
Note 5 - Model 7DX22P uses 56KΩ in this application.
Note 6 - Model 7DX22P uses 390KΩ in this application.
Note 7 - Model 7DX22P uses 100KΩ in this application.
Note 8 - Model 7DX22P uses 3.3 Meg in this application.
Note 9 - Model 7DX22P uses 2.7 Meg in this application.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: MERIT PART No.	NOTES
T1	270Ω Tap @ 160Ω & 110Ω		B-12M-15662				Hor. Deflection Transformer.

TRANSFORMER (H.V. OSC.)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: MERIT PART No.	NOTES
T2	3Ω	SEC. 1 110Ω SEC. 2 0Ω	B-20-15557				

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: BELMONT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: CHICAGO PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
T3	2100Ω	3.5Ω	192Ω	.72	B-12C-10074-4	A-3676	RO-2	A-2928	

RAYTHEON
MODELS 7DX21, 7DX22P, 18DX21A

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	BELMONT PART No.	JENSEN PART No.	QUAM PART No.	
SP1	PM	3.5Ω	B-18A-15618	ST-113† MOD.P4-X	4A07†	† Trim flange and mounting bracket.
	CONE DIA.	V. C. DIA.				
SP2	3 7/8"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	BELMONT PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	
L1	.185A	63Ω	2.6Henries	C-16A15624	C-2325	TR-4225	C-2991‡	‡ Drill one new mounting hole.

COILS (RF-IF)

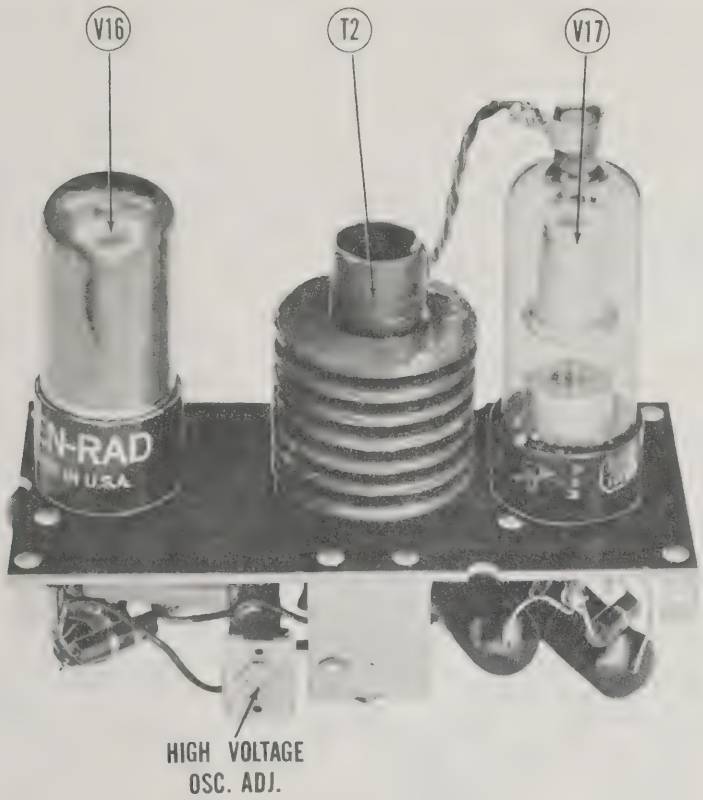
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	BELMONT PART No.	MEISSNER PART No.	
L2	Ant. Coil	0Ω		A-201-15676		
L3	High Band Antenna	0Ω				Consists of No. 18 straight, bare, tinned copper wire.
L4	Low Band Antenna	0Ω				Consists of No. 18 straight, bare, tinned copper wire.
L5	RF Choke	.2Ω		A-16A-16637		
L6	RF Choke	.2Ω		A-16A-16637		
L7	Low Band RF	0Ω		B-13E-12046		
L8A	High Band RF	0Ω		A-201-15675		Uses core with green end.
B	High Band RF	0Ω		B-13D-12155		Uses core with red end.
L9	Low Band RF	0Ω		B-13E-12046		
L10A	High Band RF	0Ω		A-201-15675		Uses core with green end.
B	High Band RF	0Ω		B-13D-12155		Uses core with red end.
L11	RF Choke	.2Ω		A-16A-16637		
L12	Low Band Osc.	0Ω		B-13D-12155		
L13	High Band Osc.	0Ω		A-13D-12045		
L14	RF Choke	.2Ω		A-16A-16637		
L15	RF Choke	.2Ω		A-16A-16637		
L16	1st IF	.1Ω		B-201-15612		
L17	2nd IF	.1Ω		B-201-15612		
L18	3rd IF	.1Ω		B-201-15612		
L19	4th IF	.1Ω		B-201-15945		
L20	RF Choke	1.5Ω		A-16A-16637		
L21	RF Choke	1.5Ω		A-16A-16637		
L22	RF Choke	1.5Ω		A-201-15608		
L23	RF Choke	1.5Ω		A-16A-16637		
L24	RF Choke	1.5Ω		A-16A-16637		
L25	Peaking	7.2Ω		A-201-16170		
L26	Peaking	22Ω		A-201-16172		
L27	Peaking	9Ω		A-201-16171		
L28	Sound Take-Off Trans.	.5Ω	.5Ω	C-201-16155		
L29	Ratio Det. Trans.	4Ω	.5Ω	C-201-15717		
L30	RF Choke	24.5Ω		A-201-15556		
L31	RF Choke	20Ω		B-16A-13524		
L32	Fil. Choke	1.5Ω		A-16A-16637		
L33	Fil. Choke	1.5Ω		A-16A-16637		
L34	RF Choke	0Ω		A-201-16379		
L35	Fil.Choke	1.5Ω		A-16A-16637		Used in model 7DX22P only.

SELENIUM RECTIFIER

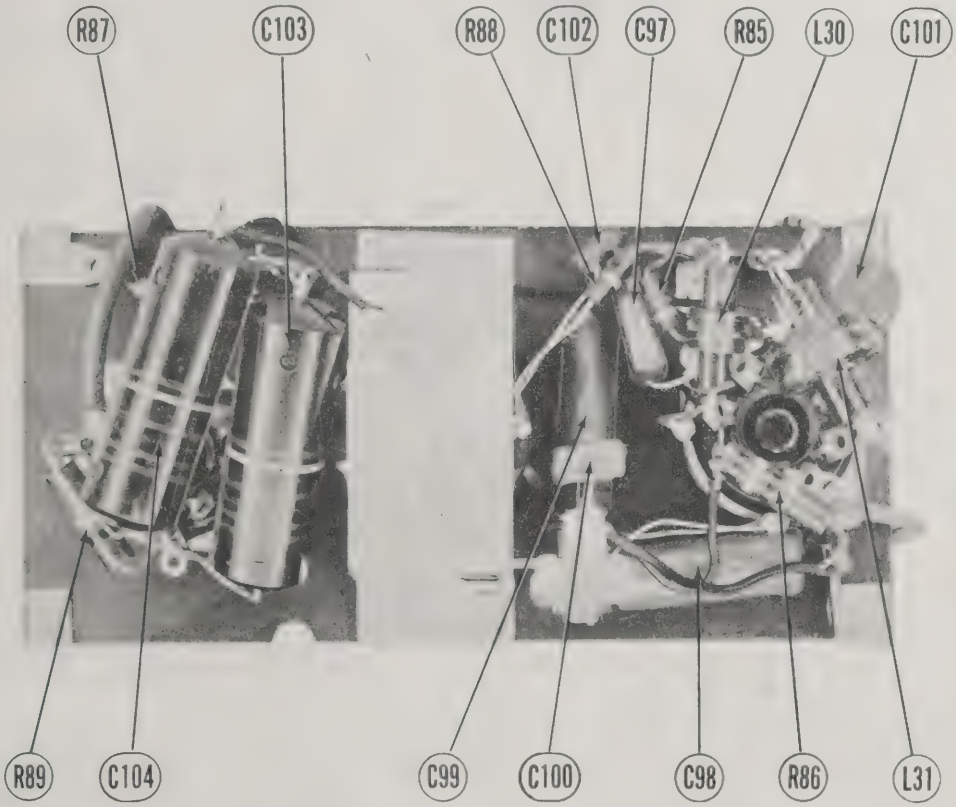
ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	BELMONT PART No.			
M1	.105A	B-21J-15661			
M2	.105A	B-21J-15661			

MISCELLANEOUS

ITEM No.	PART NAME	BELMONT PART No.	NOTES
M3	Ballast Tube	B-9M-15822	
	Iron Core	A-51A-16693	For L19
	Knob	B-5B-15759-57	For station selector
	Knob	B-5B-15782-57	For contrast, Hor. Hold, Vert. Hold and on-off vol.
	Safety Glass	C-30M-15905	
	Iron Core	A-51A-15713	For L12 and L13
	Iron Core	A-51A-15714	For L8 and L10 having green end.
	Iron Core	A-51A-16391	For L8 and L10 having red end.
	Iron Core	A-51A-15715	For L7 and L9
	Core Mounting Clip	A-2M-16276	

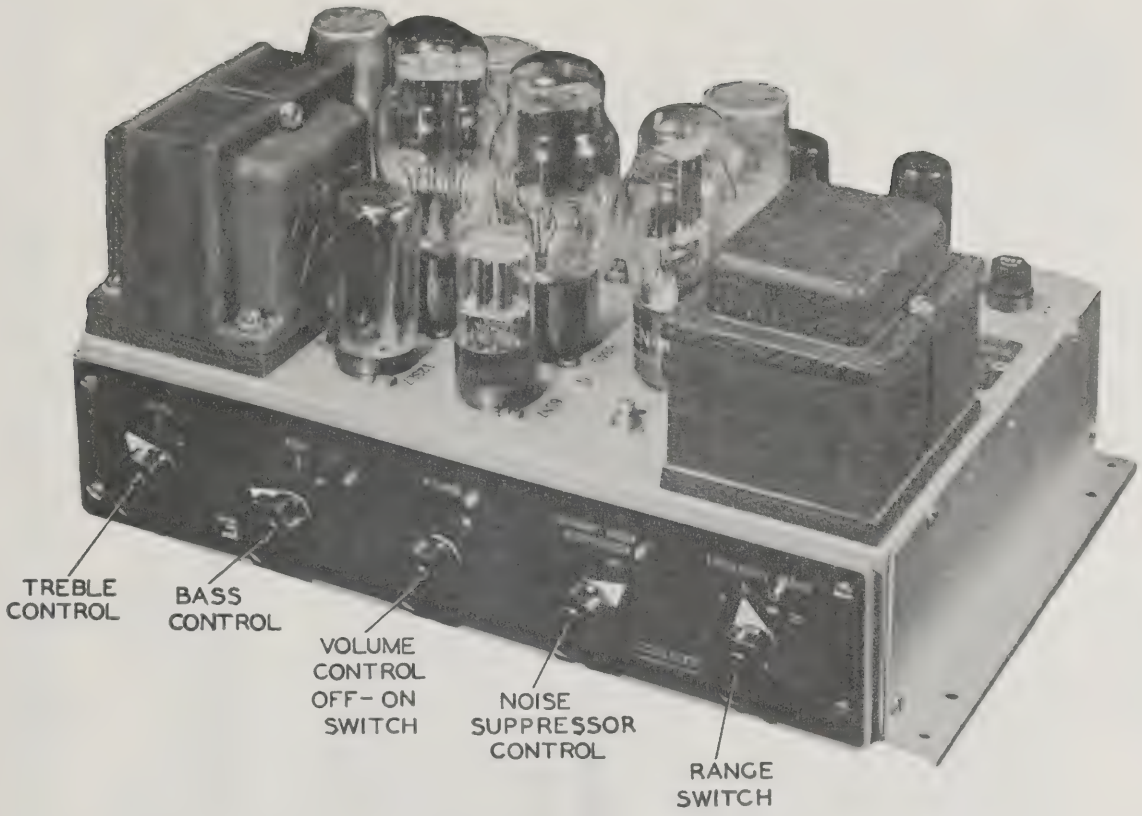


HIGH VOLTAGE SUPPLY - TOP VIEW



HIGH VOLTAGE SUPPLY - BOTTOM VIEW

SCOTT (H. H.)
MODEL 211-A



SCOTT (H. H.)
MODEL 211-A

H. H. SCOTT MODEL 211-A

TRADE NAME	H. H. Scott, Model 211-A
MANUFACTURER	Hermon Hosmer Scott Inc., 385 Putnam Ave., Cambridge 39, Mass.
TYPE SET	AC Operated Audio Amplifier with Dynamic Noise Suppressor
TUBES(TEN)	Types 12SL7GT Pre Amp., 12SL7GT Treble-Bass Boost, 6SQ7 Control Amp., 12SG7 Treble Gate, 12SG7 Treble Gate, 12SG7 Bass Gate, 6SN7GT AF-Phase Inv., (2) 6B4G Power Output, 5V4G Rectifier.
POWER SUPPLY	110-120 Volts AC RATING 1.2 Amp. at 117 Volts AC

OUTPUT CONNECTIONS

The Amplifier's output transformer is tapped for matching a number of impedances between 4 and 500 Ω, and a standard RMA octal plug is provided for this purpose. Proper connections for various speaket impedances are as follows:

IMPEDANCE:	CONNECT SPEAKER TO:	CONNECT TOGETHER:
500 ohms	Pins 1 and 8	Pins 4 - 5
336 ohms	Pins 1 and 8	Pins 2 - 7
125 ohms	Pins 1 and 8	Pins 1 - 5, 8 - 4
84 ohms	Pins 1 and 8	Pins 1 - 7, 8 - 7
16 ohms	Pins 2 and 7	Pins 4 - 5
8 ohms	Pins 3 and 6	Pins 4 - 5
4 ohms	Pins 2 and 7	Pins 2 - 5, 4 - 7
2 ohms	Pins 3 and 6	Pins 3 - 5, 4 - 6

When the rated speaker impedance does not correspond exactly to the values given in the table, use the connection giving the closest approximation, generally the next lower impedance.

HOWARD W. SAMS & CO., INC. • Indianapolis Indiana

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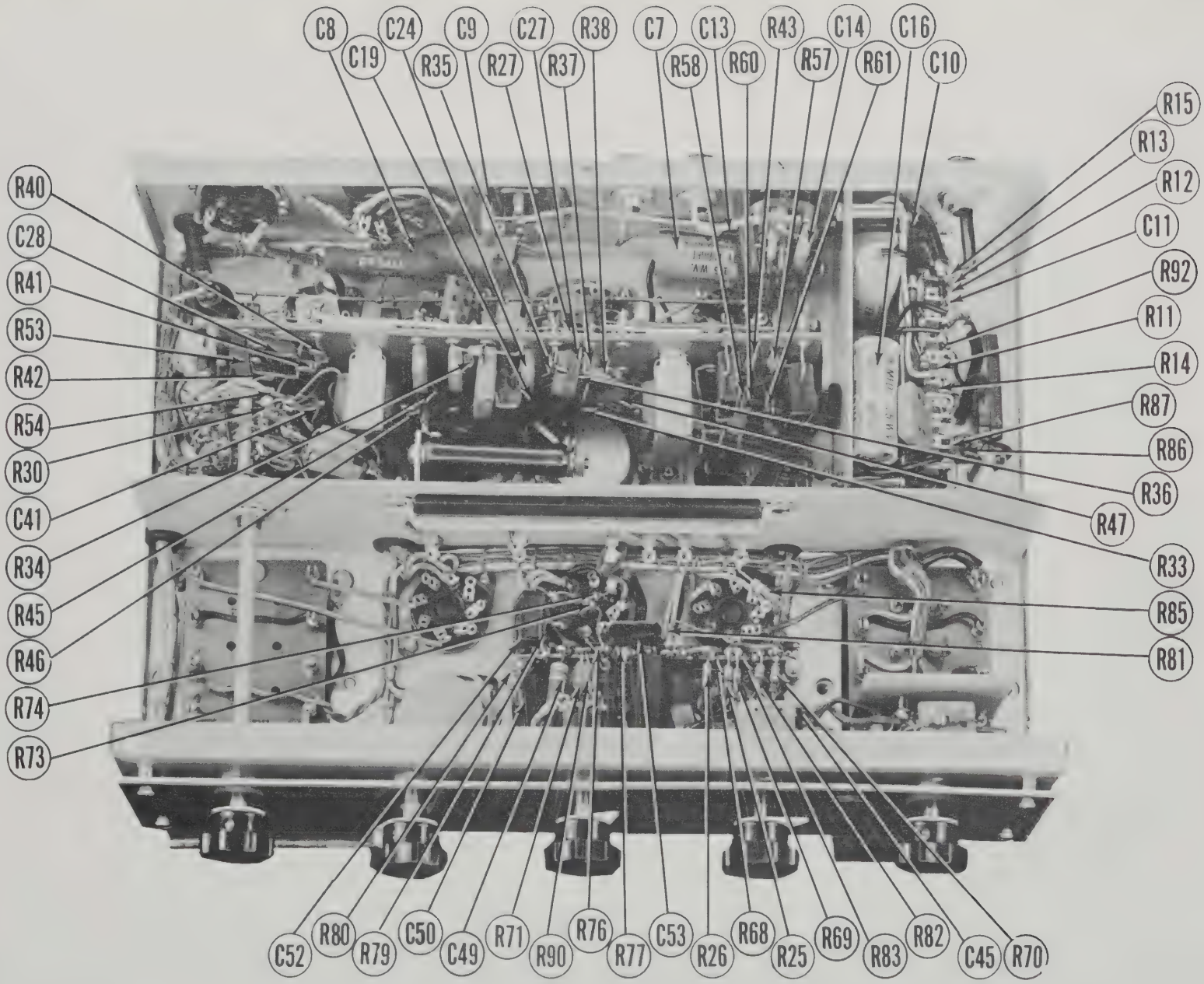
C8
C24
C9
C27
R38
C7
C13
R43
C14
C16
C19
R35
R27
R37
R58
R60
R57
R61
C10
R15
R13
R12
C11
R92
R11
R14
R87
R86
R36
R47
R33
R85
R81
R40
C28
R41
R53
R42
R54
R30
C41
R34
R45
R46
R74
R73
C52
R80
R79
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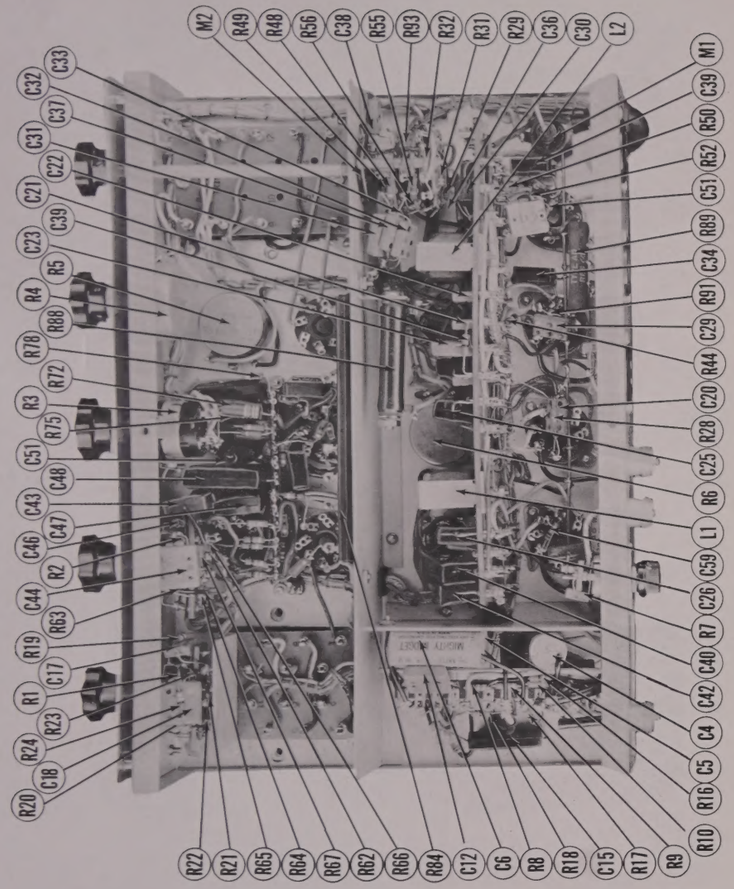
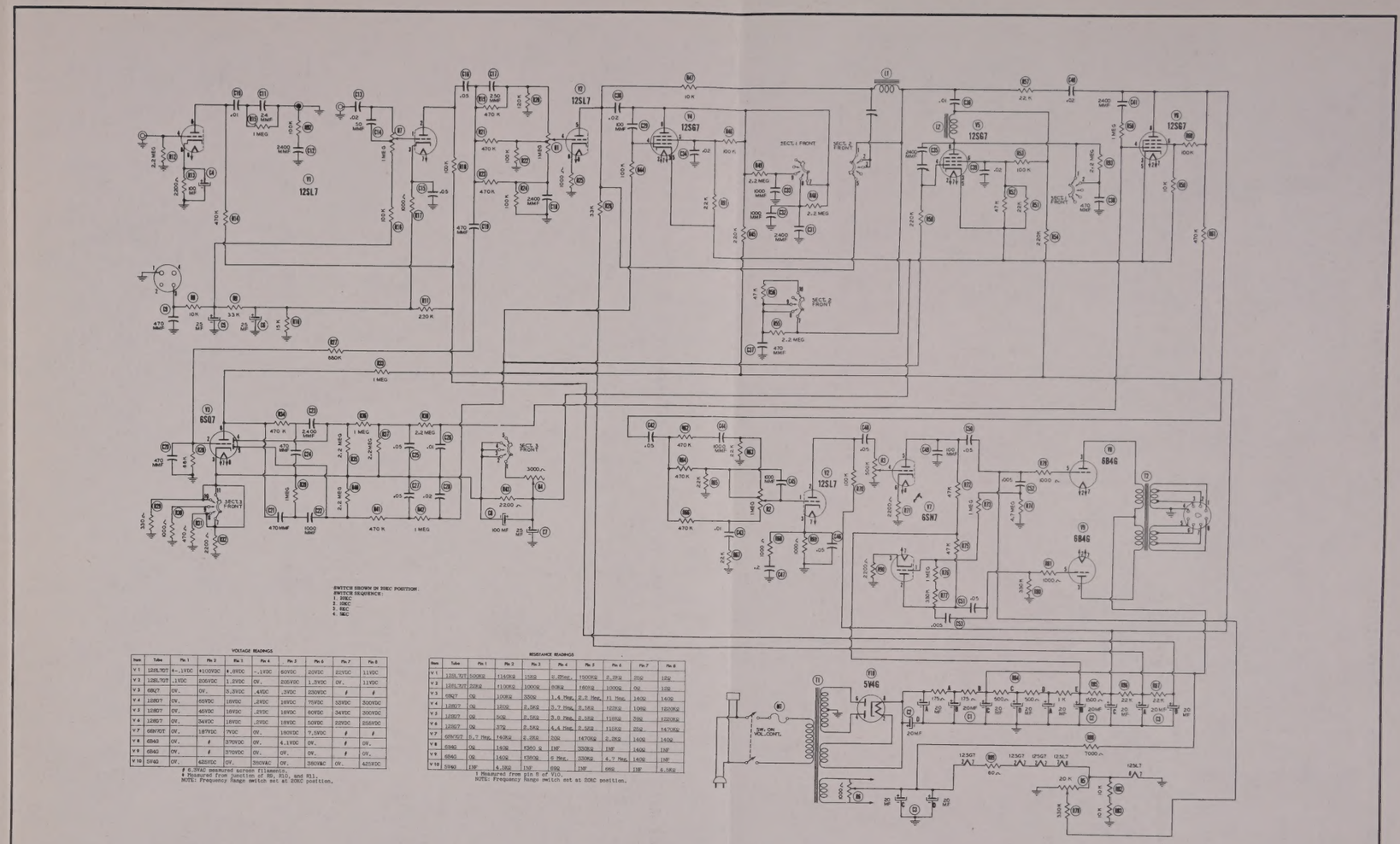
R25
R69
R83
R82
C45
R70





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SL7GT	+-.1VDC	#100VDC	#.8VDC	-.1VDC	80VDC	20VDC	22VDC	11VDC
V 3	12SL7GT	.1VDC	205VDC	1.2VDC	0V.	205VDC	1.3VDC	0V.	11VDC
V 3	6SQ7	0V.	0V.	0.3VDC	.4VDC	.3VDC	250VDC	#	#
V 4	12SG7	0V.	65VDC	16VDC	.2VDC	16VDC	75VDC	52VDC	300VDC
V 5	12SG7	0V.	60VDC	16VDC	.2VDC	16VDC	80VDC	54VDC	300VDC
V 6	12SG7	0V.	54VDC	16VDC	.2VDC	18VDC	50VDC	52VDC	250VDC
V 7	6SN7GT	0V.	187VDC	7VDC	0V.	190VDC	7.5VDC	#	#
V 8	6BA6	0V.	#	370VDC	0V.	4.1VDC	0V.	#	0V.
V 9	6BA6	0V.	#	370VDC	0V.	0V.	0V.	#	0V.
V 10	5W4G	0V.	420VDC	0V.	350VAC	0V.	350VAC	0V.	420VDC

6.3VAC measured across filaments.
Measured from junction of R9, R10, and R11.
NOTE: Frequency Range switch set at 20KC position.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SL7GT	500KΩ	114KΩ	15Ω	0.2Meg.	150KΩ	2.2KΩ	25Ω	12Ω
V 2	12SL7GT	20KΩ	11.5KΩ	100Ω	20KΩ	150KΩ	100Ω	0Ω	12Ω
V 3	6SQ7	0Ω	10KΩ	30Ω	1.4 Meg.	2.0 Meg.	11 Meg.	250Ω	160Ω
V 4	12SG7	0Ω	12KΩ	2.5KΩ	3.7 Meg.	3.5KΩ	127KΩ	10KΩ	120KΩ
V 5	12SG7	0Ω	5KΩ	2.5KΩ	2.0 Meg.	2.5KΩ	110KΩ	20Ω	120KΩ
V 6	12SG7	0Ω	37Ω	2.5KΩ	4.4 Meg.	2.5KΩ	112KΩ	25Ω	147KΩ
V 7	6SN7GT	5.7 Meg.	140KΩ	2.2KΩ	20Ω	147KΩ	2.2KΩ	140Ω	140Ω
V 8	6BA6	0Ω	140Ω	4240 Ω	1MΩ	350KΩ	1MΩ	140Ω	1MΩ
V 9	6BA6	0Ω	140Ω	1200Ω	0 Meg.	350KΩ	4.7 Meg.	140Ω	1MΩ
V 10	5W4G	1MΩ	6.5KΩ	1MΩ	69Ω	1MΩ	69Ω	1MΩ	6.5KΩ

1 Measured from pin 8 of V10.
NOTE: Frequency Range switch set at 20KC position.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Pre Amp.	12SL7GT	12SL7GT	8BD	
V2	Treble Boost-Bass Boost	12SL7GT	12SL7GT	8BD	
V3	Control Amp.	6SQ7	6SQ7	8Q	
V4	Treble Gate	12SG7	12SG7	8BK	
V5	Treble Gate	12SG7	12SG7	8BK	
V6	Bass Gate	12SG7	12SG7	8BK	
V7	AF Amp.-Phase Inv.	6SN7GT	6SN7GT	8BD	
V8	Power Output	6B4G	6B4G	5S	
V9	Power Output	6B4G	6B4G	5S	
V10	Rectifier	5V4G	5V4G	5L	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SCOTT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	20	475		AF4444X	UP2250		D14744	▪ Filter
B	20	475			UP2250			■ Filter
C	20	475						▲ Filter
D	20	475						Filter
C2A	20	475		AF4444X	UP2250		D14744	▪ Filter
B	20	475			UP2250			■ Filter
C	20	475						▲ Filter
D	20	475						Filter
C3A	20	475		AF4444X	UP2250		D14744	▪ Filter
B	20	475			UP2250			■ Filter
C	20	475						▲ Filament Bypass
D	20	475						Filament Bypass
C4	100	15		PRS25/100	BRH-151		UHC-115	Pre-Amp. Cath. Bypass
C5	25	25		PRS25/25	BR252A		TVA-6	Squelch Filter
C6	25	25		PRS25/25	BR252A		TVA-6	Squelch Filter
C7	25	25		PRS25/25	BR252A		TVA-6	Cathode Bypass
C8	100	15		PRS25/100	BRH-151		UHC-115	Cathode Bypass
C9	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Squelch Filter
C10	.01	600		638T-01	TVC6S1		PX-116	Audio Coupling
C11	24	500		1468-000025	5W5Q25	GP1K-25	MS-425	Tone Compensation
C12	2400	500		1467-0025	1W5D25	GP2M-0025		Tone Compensation
C13	.02	400		689-02	TVC6S2		PX-126	Audio Coupling
C14	50	500		1468-00005	5W5Q5	GP1K-50	1FM-45	Tone Compensation
C15	.05	600		689-05	TVC6S5		PX-156	Pre-Amp Cath. Bypass
C16	.05	600		689-05	TVC6S5		PX-156	Audio Coupling
C17	250	500		1468-00025	5W5T25	GP2K-250	1FM-325	Tone Compensation
C18	2400	500		1467-0025	1W5D25	GP2M-0025		Tone Compensation
C19	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Audio Coupling
C20	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Tone Compensation
C21	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Treble Diode Coupling
C22	1000	500		1468-001	1W5D1	GP2L-001	1FM-21	Treble Diode Coupling
C23	2400	500		1467-0025	1W5D25	GP2M-0025		Bass Diode Coupling
C24	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	AF Feedback
C25	.05	600		689-05	TVC6S5		PX-156	Treble Diode Filter
C26	.01	600		638T-01	TVC6S1		PX-116	Treble Diode Filter
C27	.05	600		689-05	TVC6S5		PX-156	Bass Diode Filter
C28	.02	400		689-02	TVC6S2		PX-126	Bass Diode Filter
C29	100	500		1468-0001	5W5T1	GP1K-100	1FM-31	Phase Shift Cap.
C30	.02	400		689-02	TVC4S2		PX-126	Audio Coupling
C31	2400	500		1467-0025	1W5D25	GP2M-0025		Tone Compensation
C32	1000	500		1468-001	1W5D1	GP2L-001	1FM-21	Tone Compensation
C33	1000	500		1468-001	1W5D1	GP2L-001	1FM-21	Tone Compensation
C34	.02	400		689-02	TVC4S2		PX-126	Treble Gate Screen Bypass
C35	2400	500		1467-0025	1W5D25	GP2M-0025		Phase Shift Cap.
C36	.01	600		638T-01	TVC6S1		PX-116	Audio Coupling
C37	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Tone Compensation
C38	470	500		1468-0005	5W5T5	GP2K-470	1FM-35	Tone Compensation
C39	.02	400		689-02	TVC4S2		PX-126	Treble Gate Screen Bypass

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R40	2.2 Meg.	½		BTS-2.2 Meg.	Treble Diode Load
R41	470KΩ	½		BTS-470K	Treble Diode Load
R42	1 Meg.	½		BTS-1 Meg.	Treble Diode Filter
R43	2200Ω	½		BTS-2200	Treble and Bass Gate Cathode
R44	100KΩ	½		BTS-100K	Treble Gate Grid
R45	220KΩ	½		BTS-220K	Treble Gate Plate
R46	100KΩ	1		BTA-100K	Treble Gate Screen
R47	10KΩ	½		BTS-10K	Tone Compensation
R48	2.2 Meg.	½		BTS-2.2 Meg.	Tone Compensation
R49	2.2 Meg.	½		BTS-2.2 Meg.	Tone Compensation
R50	220KΩ	½		BTS-220K	Treble Gate Grid
R51	22KΩ	½		BTS-22K	Voltage Divider
R52	47KΩ	½		BTS-47K	Voltage Divider
R53	100KΩ	1		BTA-100K	Treble Gate Screen
R54	220KΩ	½		BTS-220K	Treble Gate Plate
R55	2.2 Meg.	½		BTS-2.2 Meg.	Tone Compensation
R56	47KΩ	½		BTS-47K	Tone Compensation
R57	22KΩ	½		BTS-22K	Tone Compensation
R58	1 Meg.	½		BTS-1 Meg.	Tone Compensation
R59	10KΩ	½		BTS-10K	Voltage Divider
R60	100KΩ	1		BTA-100K	Bass Gate Screen
R61	470KΩ	½		BTS-470K	Bass Gate Plate
R62	470KΩ	½		BTS-470K	Tone Compensation
R63	22KΩ	½		BTS-22K	Tone Compensation
R64	470KΩ	½		BTS-470K	Tone Compensation
R65	22KΩ	½		BTS-22K	Tone Compensation
R66	470KΩ	½		BTS-470K	Tone Compensation
R67	22KΩ	½		BTS-22K	Tone Compensation
R68	1000Ω	½		BTS-1000	Tone Compensation
R69	1000Ω	½		BTS-1000	Bass Boost Cathode
R70	100KΩ	½		BTS-100K	Bass Boost Plate
R71	2200Ω	½		BTS-2200	AF Cathode
R72	47KΩ	1		BTA-47K	AF Plate
R73	1 Meg.	½		BTS-1 Meg.	Phase Inv. Grid
R74	4.7 Meg.	½		BTS-4.7 Meg.	Phase Inv. Grid
R75	47KΩ	1		BTA-47K	Phase Inv. Plate
R76	1 Meg.	½		BTS-1 Meg.	Feedback
R77	330KΩ	½		BTS-330K	Feedback
R78	330KΩ	½		BTS-330K	Output Grid
R79	1000Ω	½		BTS-1000	Output Grid
R80	330KΩ	½		BTS-330K	Output Grid
R81	1000Ω	½		BTS-1000	Output Grid
R82	10KΩ	½		BTS-10K	Voltage Divider
R83	10KΩ	½		BTS-10K	Voltage Divider
R84A	175Ω	10		AB-200	Filter, Wire Wound
B	175Ω	10		AB-200	Filter, Wire Wound
C	500Ω	5	210-MW5	AB-500	Filter, Wire Wound
D	500Ω	5		AB-500	Filter, Wire Wound
E	1000Ω	10		AB-1000	Filter, Wire Wound
R85	1500Ω	½		BTS-1500	Filter, Wire Wound
R86	22KΩ	½		BTS-22K	Filter, Wire Wound
R87	22KΩ	½		BTS-22K	Filter, Wire Wound
R88	7000Ω	20		DG-7000	Voltage Dropping, Wire Wound
R89	60Ω	10			Filament Dropping, Wire Wound
R90	2200Ω	½		BTS-2200	Phase Inv. Cathode
R91	22KΩ	½		BTS-22K	Voltage Divider
R92	100KΩ	½		BTS-100K	Tone Compensation
R93	2.2 Meg.	½		BTS-2.2 Meg.	Tone Compensation

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC at 1.2A	750VCT .160ADC	5VAC at 2A	6.3VAC at 2.9A				

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	INSTALLATION NOTES
T2	3.5KΩ CT	500Ω 336Ω 125Ω 84Ω 16Ω 8Ω 4Ω 2Ω	82Ω CT	15Ω 15Ω 3.6Ω 3.6Ω .4Ω .4Ω .1Ω .1Ω					

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	INSTALLATION NOTES
L1		550Ω	1 Henry					
L2		145Ω	.3 Henry					

MISCELLANEOUS

ITEM No.	PART NAME	SCOTT PART No.	NOTES
M1	Fuse		2 Amp. 250 Volt
M2	Switch		Freq. Range

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
R1	1 Meg.	½		Q19-137X	T-112	Treble Control, tapped at 500KΩ
R2	1 Meg.	½		Q19-137X	T-112	Bass Control, tapped at 500KΩ
R3A	500KΩ	2		Q13-133	M-60-Z	Volume Control
B	Switch			76-2	SW-A2	Attached to R3A per instructions
R4	3000Ω	½				Noise Suppressor Control
R5	20KΩ	2				Hum Balance Control (Wire Wound)
R6	1000Ω	2		W-1000	43-1000	Hum Balance Control (Wire Wound)
R7	1 Meg.	½		Q19-137X	T-112	Suppressor Level Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SCOTT PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R8	10KΩ	½		BTS-10K	Squelch Filter
R9	33KΩ	½		BTS-33K	Squelch Filter
R10	15KΩ	½		BTS-15K	Voltage Divider
R11	220KΩ	½		BTS-220K	Voltage Divider
R12	2.2 Meg.	½		BTS-2.2 Meg.	Pre Amp. Grid
R13	2200Ω	½		BTS-2200	Pre Amp. Cathode
R14	470KΩ	½		BTS-470K	Pre Amp. Plate
R15	1 Meg.	½		BTS-1 Meg.	Tone Compensation
R16	100KΩ	½		BTS-100K	Pre Amp. Grid
R17	1000Ω	½		BTS-1000	Pre Amp. Cathode
R18	100KΩ	½		BTS-100K	Pre Amp. Plate
R19	470KΩ	½		BTS-470K	Tone Compensation
R20	100KΩ	½		BTS-100K	Tone Compensation
R21	470KΩ	½		BTS-470K	Tone Compensation
R22	100KΩ	½		BTS-100K	Tone Compensation
R23	470KΩ	½		BTS-470K	Tone Compensation
R24	100KΩ	½		BTS-100K	Tone Compensation
R25	1000Ω	½		BTS-1000	Treble Boost Cathode
R26	33KΩ	½		BTS-33K	Treble Boost Plate
R27	680KΩ	½		BTS-680K	Tone Compensation
R28	68KΩ	½		BTS-68K	Control Amp. Grid
R29	330Ω	½		BW-½-330	Control Amp. Cathode
R30	1000Ω	½		BTS-1000	Control Amp. Cathode
R31	470Ω	½		BTS-470	Control Amp. Cathode
R32	2200Ω	½		BTS-2200	Control Amp. Cathode
R33	1 Meg.	½		BTS-1 Meg.	Control Amp. Plate
R34	470KΩ	½		BTS-470K	Tone Compensation
R35	2.2 Meg.	½		BTS-2.2 Meg.	Bass Diode Load
R36	1 Meg.	½		BTS-1 Meg.	Bass Diode Load
R37	2.2 Meg.	½		BTS-2.2 Meg.	Bass Diode Load
R38	2.2 Meg.	½		BTS-2.2 Meg.	Bass Diode Filter
R39	1 Meg.	½		BTS-1 Meg.	Tone Compensation

SQUELCH

The amplifier incorporates a squelch cicuit which silences the amplifier during the operation of a record changer and an automatic fade-in feature, preventing any undesirable effects as the squelch releases. To use the squelch feature, a simple contactor is added to the record changer which shorts to the changer frame during the entire change cycle. The contactor is connected to pin #3 of the 4-prong plug marked SQUELCH. The frame of the changer must be grounded by either the shield on the pickup lead or a wire to pin #1 on the squelch plug; not both.

HUM ADJUSTMENTS

On the amplifier chassis are two screwdriver hum adjustments. These are set at the factory for minimum hum with the original tubes in the amplifier. When new tubes are installed or hum becomes objectionable for any reason , these should be readjusted. The one nearest the control panel is set first, with the Volume control off (power switch on), Bass control on full, Range switch on 20KC. Then the Volume control is turned on full and the second hum adjustment made.

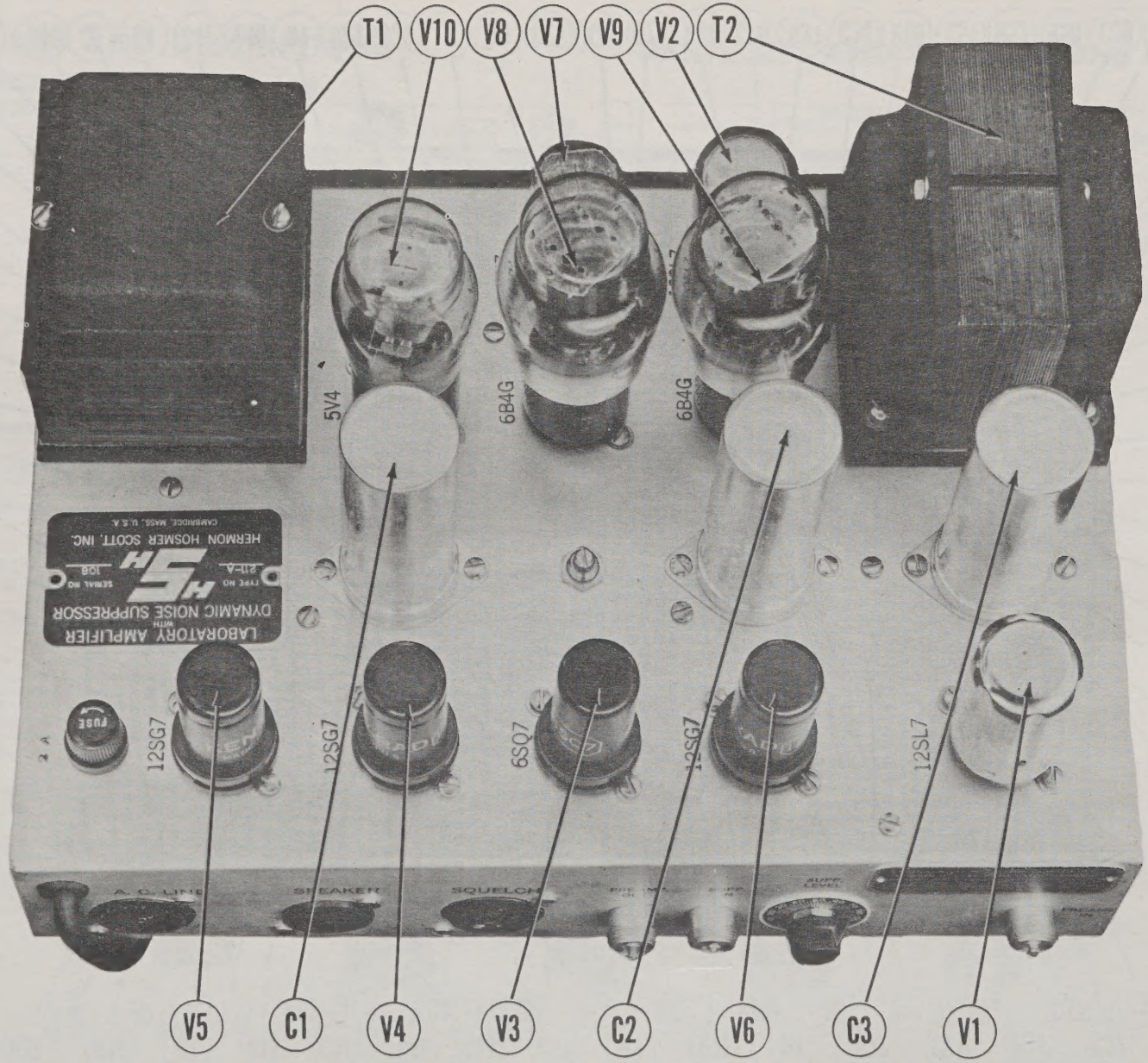
SUPPRESSOR LEVEL ADJUSTMENT

This adjustment is set at the factory for the particluar pickup supplied and the setting of this control should not be varied unless another pickup or tuner is connected to the suppressor in jack For setting of this adjustment proceed as follows: Connect a 20,000 ohm-per-volt meter from the plate of the 12SG7 in the rear corner of the chassis to ground. With the Range switch on "10" set the suppression control so the meter reads 125 volts. Play the 1000 cycle band of the Columbia 10004 M test record with the pickup in question. Adjust the level control so that the meter reads the following voltages for the three positions of the range switch:

POSITION	METER READING
10KC	245 - 250
8KC	220 - 225
5KC	185 - 195

This level control should be set so that the meter readings agree "on the average" with the above values. for all positions of the Range switch. In the 20KC position, the meter should read well over 250 volts with or without input signal.

SET 18
FOLDER 14


T1
V10
V8
V7
V9
V2
T2
5V4
6B4G
6B4G
12SG7
12SG7
6SQ7
12SG7
12SL7
V5
C1
V4
V3
C2
V6
C3
V1